

WOMEN'S PARTICIPATION IN THE AUSTRALIAN DIGITAL CONTENT INDUSTRY

Thesis in fulfillment of the requirements for the degree of
Doctor of Philosophy (PhD)

submitted by

Anitza A. Geneve

M. Prof. Comm USQ, Grad. Dip. Adult and Voc. Ed. GU,
B Arts SCU, Assoc.Deg. Resource Technology UNE

PhD Candidate

Faculty of Science and Technology, School of Information Technology
Queensland University of Technology

Principal Supervisor

Professor Karen Nelson

Associate Supervisors

Associate Professor Ruth Christie, Dr Greg Timbrell, Dr Michael Middleton
June 2013

Not to be reproduced without permission or full reference to the author as per Creative Commons Attribution license

Keywords

Digital Content Industry (DCI), Information Communication Technology (ICT), Gender, Human Agency, Interactive Content Creator, Multimedia, New Media, Games, Critical Realism (CR), Theoretical Scaffold, Multi-Theory Scaffold (MTS), Human Agency Multi-Theory Scaffold (HAMTS)

List of Abbreviations

ABS	Australian Bureau of Statistics
AIMIA	Australian Interactive Media Industry Association
ANZSCO	Australian and New Zealand Standard Classification of Occupations
AU	Australia
CR	Critical Realism
DCI	Digital Content Industry
DCITA	Department of Communications, Information Technology and the Arts
EEO	Equal Employment Opportunity
GDA	Games Developers' Association of Australia
GFC	Global Financial Crisis
ICT	Information and Communications Technology
IDT	Individual Differences Theory
IGDA	International Game Developers Association
IS	Information System
IT	Information Technology
MTS	Multi-Theory Scaffold
SCCT	Social Cognitive Career Theory
SCT	Social Cognitive Theory
ST	Structuration Theory
STG	Social Theory of Gender
TAFE	Technical and Further Education
UK	United Kingdom
UN	United Nations
US	United States of America
VET	Vocational Education and Training
WIT	Women in Technology
WoW	World of Warcraft

Abstract

The purpose of the reported research is to investigate the research problem: Why do women participate in the Australian Digital Content Industry (DCI). The research investigates two research questions: 1) What are the influences on women's participation? and 2) How can we understand these influences? The research problem arises as a result of a global pattern of women traditionally being under-represented in the industries related to technology use and development, and the continued under-representation of women in multimedia and games development production.

The research approach employed an exploratory case study, underpinned by a Critical Realist ontology, which aimed for empirical, theoretical, and explanatory insights. Multiple sources of qualitative data were collected over the 2007-2011 period. Primary data included the results of semi-structured interviews with 18 female interactive content creators employed in the DCI in the city of Brisbane, Australia. Secondary data sources included industry reports and popular media. Data analysis employed three frameworks: 1) analytical (based on previous research in the domain); 2) theoretical (employing concepts from four Human Agency theories); and 3) ontological (Critical Realism; specifically, Bhaskar's three domains of reality). Each framework guides the identification of the influences on women's participation in the DCI, and provides an approach to understanding these influences.

Findings from the analysis of data using each of the frameworks reveals a range of influences on women's participation in the DCI, which include: the characteristics of the environment (such as cultural practices in the workplace) and the individual (such as self-efficacy); the events women experience (such as becoming a parent); and the underlying mechanisms women can harness (such as gaining industry-relevant skills).

Several models are developed to offer an original approach to understanding women's participation in the DCI. In addition, the *Multi Theory Scaffold (MTS)* model offers an approach for the use of multiple theories to scaffold inductive research. The key contribution of this research is its synthesis of the analysis of the empirical data using the three frameworks to develop the *Five Acts of Agency (FAA)* model and *Acts of Agency* theory. The *FAA* identifies 10 agent-driven mechanisms that manifest in the interaction between the environment and the individual. Agent-driven mechanisms focus on the causal effect of people themselves; that is, the role individuals themselves play in their participation.

Understanding influences from the perspective of agent-driven mechanisms also provides a new approach to planning and evaluating strategies that aim to foster women's participation in the DCI. Fostering women's participation in the DCI, in turn, can also address concerns regarding the general participation of women in other areas of society. The research contributes to an area where there has been little empirical or theoretical academic research to date.

Table of Contents

CHAPTER 1: INTRODUCTION.....	15
1.1 Personal Motivation	16
1.2 Context	17
1.3 Problem Statement, Research Questions and Objectives	19
1.4 Research Approach	20
1.5 Research Contribution.....	23
1.6 Chapter Summary.....	24
CHAPTER 2: WOMEN'S PARTICIPATION IN THE DCI.....	27
2.1 The Choice of Literature	27
2.2 An Overview of the Australian DCI.....	29
2.3 Current Participation of Women in the DCI.....	32
2.3.1 What is Participation	32
2.3.2 Women's Inequitable Participation	33
2.3.3 Why Participation Matters	36
2.4 Influences on Women's Participation.....	38
2.5 Initial Methodological Considerations	43
2.6 Chapter Summary.....	50
CHAPTER 3: WAYS TO UNDERSTAND INFLUENCES	52
3.1 Framework 1: Analytical model (E, P, I)	53
3.1.1 Environment (E) Influences	56
3.1.2 Person (P) Influences	58
3.1.3 Interaction (I) between the Environment (E) and Person (P)	59
3.1.4 Summary	61
3.2 Framework 2: Theoretical (Human Agency Theory)	61
3.2.1 The role of theory.....	62
3.2.2 Multi-Theory Scaffold (MTS).....	65
3.2.3 Human Agency Theory.....	71
3.2.4 A Human Agency Multi-Theory Scaffold (HAMTS)	74
3.2.5 Summary	80
3.3 Framework 3: Ontological (Critical Realism)	81
3.3.1 A Critical Realist Ontology.....	81
3.3.2 A Critical Realist Framework	83
3.3.3 Summary	86
3.4 Chapter Summary.....	86
CHAPTER 4: RESEARCH DESIGN	89
4.1 Case Study as a Strategy of Enquiry	90
4.1.1 Case study context, boundary and unit of analysis.....	93
4.2 Data Collection.....	95
4.2.1 Participant Sampling	95
4.2.2 Data Collection	97
4.3 Data Analysis	105
4.3.1 Danermark et al.'s (2002) Six Stage Model of Explanation.....	106
4.3.2 Analysis of Data.....	112
4.4 Quality.....	115
4.4.1 Critical realist criteria.....	115
4.4.2 Qualitative criteria.....	118
4.4.3 Case study criteria.....	119
4.4.4 Ethics.....	119
4.5 Theory Generation.....	121
4.6 Chapter Summary.....	123

CHAPTER 5: FINDINGS	125
5.1 An Overview of the Case study	126
5.2 Framework 1: Analytical (E, P, I)	132
5.2.1 The Environment (E)	133
5.2.2 The Person (P)	155
5.2.3 The Interaction (I)	163
5.2.4 Refinement of Framework 1	179
5.3 Framework 2: Theoretical (Human Agency MTS)	179
5.3.1 Meta-theory: Structuration Theory (ST)	180
5.3.2 Critical Theory: Social Theory of Gender (STG)	184
5.3.3 Middle-range theory: Social Cognitive Theory (SCT)	185
5.3.4 Operationalised theory: Social Cognitive Career Theory (SCCT)	194
5.4 Framework 3: Ontological (Critical Realism)	194
5.4.1 Agent-driven mechanisms	195
5.5 Chapter Summary	209
CHAPTER 6: DISCUSSION	211
6.1.1 What are the influences?	215
6.1.2 Framework 1 (The guiding analytical Framework): E, P, and I	217
6.1.3 Outcome: Sphere of Influence (SoI) Model	234
6.1.4 Outcome: Events of Interaction (EOI) model	236
6.1.5 Summary	238
6.1.6 Framework 2: The Human Agency Multi-Theory Scaffold (HAMTS)	239
6.1.7 Summary	246
6.1.8 Framework 3: Ontological (Critical Realism)	246
6.1.9 Summary	252
6.2 A synthesis of the three Frameworks	252
6.2.1 The Complementary Value of the Three Frameworks	252
6.2.2 The focus on agent-driven mechanisms	256
6.2.3 Outcome: The Five Acts of Agency (FAA) Model	260
6.2.4 Outcome: The Acts of Agency Theory	279
6.3 Application of the Five Acts of Agency (FAA) Model	286
6.3.1 Proposing Strategies by drawing on the Five Acts of Agency	286
6.3.2 Evaluating Strategies by drawing on the Five Acts of Agency	295
6.3.3 Summary	297
6.4 Chapter Summary	300
CHAPTER 7: CONCLUSIONS	302
7.1 Addressing the research problem	304
7.1.1 The influences on women's participation	305
7.1.2 Three Frameworks with which to Identify and Understand influences	306
7.2 Contribution	317
7.3 Limitations of the research	319
7.4 Future research opportunities	321
7.5 Final comment	323

List of Illustrations

Figure 1: Multimedia and games as a subset of core ICT industries (ACS, 2001; in Houghton, 2001).....	30
Figure 2: The DCI in relation to the ICT and traditional cultural industries	30
Figure 3: Games workers' characteristics in Australia, June 2006-2007(Source: AIMIA, 2011-based on ABS data)	35
Figure 4: Framework 1: Analytical Framework comprised of three categories (E, P and I)	55
Figure 5: The <i>HAMTS</i> theoretical framework (Framework 2)	75
Figure 6: Framework 3: ontological framework comprised of three concepts from Bhaskar's Critical Realist ontology.....	83
Figure 7: Illustration of the context and 'unit of analysis' of the reported case study.....	95
Figure 8 Example of Nvivo project showing tree nodes	113
Figure 9: Refined 'Environment' (E) category	133
Figure 10: 'Early career' context within the social dimension of the 'Environment' (E) category	135
Figure 11: Macro and micro levels across the four dimensions of the Environment (E)	137
Figure 12: Refined Person (P) category	155
Figure 13: Components of an 'Act of Agency'	196
Figure 14: The Enabled 'Act of Agency'	198
Figure 15: The Connected 'Act of Agency'	199
Figure 16: The Collaborative 'Act of Agency'	200
Figure 17: The Creative 'Act of Agency'	203
Figure 18: The Human 'Act of Agency'	206
Figure 19: Visual representation of this ('Discussion') chapter.....	214
Figure 20: Examples of the types of influences on women's participation in the DCI	216
Figure 21: Social settings and agents in the social dimension from a lifespan perspective.....	221
Figure 22: Extending the person category.....	227
Figure 23: Refinement of the first two categories in Framework 1 resulted in the <i>Sphere of Influence (SoI)</i> model	234
Figure 24: Positioning the analytical category of 'women' in the <i>Sphere of Influence (SoI)</i>	235
Figure 25: Development of the <i>SoI</i> and <i>EoI</i> models	237
Figure 26: Benefits of a <i>Multi-Theory Scaffold (MTS)</i>	242
Figure 27: The <i>MTS</i> supports Stage 3 of Danermark et al.'s (2002) model.....	250
Figure 28: The <i>HAMTS</i> assists in the abstraction of mechanisms identified in the <i>Five Acts of Agency</i>	251
Figure 29: Extending Framework 1 to include the agent-driven mechanisms	257
Figure 30: Identifying agent-driven mechanisms by drawing on Critical Realism and agency theory	258
Figure 31: <i>Five Acts of Agency</i> : Ten agent-driven mechanisms	261
Figure 32: The elements and relationships involved in the <i>Acts of Agency</i> theory	281
Figure 33: Model of Girls Career Choices (Adya and Kaiser, 2005).	355
Figure 34: Career stage model (Ahuja, 2002)	355
Figure 35: Webb and Young's (2005) major and sub-themes.....	355

List of Tables

Table 1 Summary of the three frameworks used to analyse the empirical data.....	20
Table 2 Summary of research questions, aims, approach, and findings	22
Table 3 Overview of chapters	25
Table 4 Types of literature informing the research	28
Table 5 Game development workers by employment type and gender at end June 2007 (ABS, 2008a)	34
Table 6 Participation rates of programmers in the Australian and international DCI	36
Table 7 Theoretical approaches to explaining influences on women's participation in ICT.....	48
Table 8 Examples of strategies/initiatives to foster women's participation (a full table with further information is included in Appendix 3)	49
Table 9 Conceptual framework offered by IDT (Trauth et al., 2004; Trauth, et al., 2005)	54
Table 10 The four types of theory in a <i>Multi-Theory Scaffold (MTS)</i>	67
Table 11 Framework 2: the <i>HAMTS</i> comprised of four Human Agency-related theories.....	74
Table 12 <i>SCT</i> concepts (Bandura, 1997) evident in previous research	78
Table 13 Key Critical Realist authors informing the research approach.....	82
Table 14 Ontological assumptions of the Critical Realist view	83
Table 15 The three frameworks to address methodological concerns.....	88
Table 16 Case study outcomes resulting from the research conducted in this dissertation	92
Table 17 Relevant characteristics of a case study approach.....	93
Table 18 Context of the case study	94
Table 19 Examples of sampling strategies in the reported case study.....	96
Table 20 Types of data in the case study based on Layder's <i>Adaptive Theory</i> (1998).....	98
Table 21 Data source and collection method employed in the reported case study	98
Table 22 Examples of secondary sources of data and reasons for their inclusion (Full list in Appendix 17)	104
Table 23 Danermark et al.'s (2002) six stage model broadly aligned to the three frameworks.....	106
Table 24 Summary of key analysis activities aligned to the three frameworks used, and to Danermark et al.'s (2002) model of explanation	114
Table 25 Generalisability of case study findings	118
Table 26 Summary of research design presented in Chapters 3 and 4	124
Table 27 Case study participants (female DCI workers and industry stakeholders)	127
Table 28 Overview of female DCI participants	128
Table 29 Overview of stakeholder participants.....	129
Table 30 Case study organisations (including games and multimedia production)	129
Table 31 Lifespan stages and contexts of participation.....	134
Table 32 Matrix of influences across the four dimensions of the 'Environment' (E) category from a life stage perspective	136
Table 33 Examples of influence in the DCI within the environment dimension.....	138
Table 34 Micro context related to lifespan stages.....	139
Table 35 Social agents identified within social settings.....	139
Table 36 Hours worked by Phase 1 participants	145
Table 37 Examples of the types of media and messages within the mediated dimension.....	152
Table 38 Examples of resources across a lifespan perspective	154
Table 39 The 10 <i>Events of Interaction</i> manifesting in the 'actual' domain of reality	164
Table 40 Female interactive content creators' access to the DCI.....	165
Table 41 Concepts from the Human Agency Multi-Theory Scaffold (<i>HAMTS</i>).....	180
Table 42 Empirical evidence of Giddens' concept of modalities.....	180
Table 43 Empirical evidence of Bandura's person mechanisms	186
Table 44 Empirical evidence of Bandura's environmental mechanisms.....	191
Table 45 How the three frameworks illuminated the three 'domains of reality'	195
Table 46 The <i>Five Acts of Agency</i> : The underlying agent-driven mechanisms.....	195
Table 47 <i>Five Acts of Agency</i> : Empirical evidence of agent-driven mechanisms	197
Table 48 Examples of the temporal aspect of influences on participation	235
Table 49 Linking the <i>Events of Interaction</i> to previous research.....	238
Table 50 A summary of recommendations to foster the participation of women in the DCI.....	294
Table 51 The <i>Five Acts of Agency</i> and strategies for the event of motherhood.....	295

Table 52 Examples of agent-driven mechanisms (in the <i>FAA</i> model), linked to possible strategies	296
Table 53 Use of the <i>Five Acts of Agency model</i> to evaluate <i>Smart Women – Smart State Strategies Science, Engineering and Technology Action Plan, 2006 – 2009</i> (Queensland Government, 2006c)	298
Table 54 Examples of future areas of research resulting from this dissertation	322
Table 55 Examples of strategies fostering girls and women’s participation	352
Table 56 Example of influences on participation as identified in ICT and DCI literature	353
Table 57 Teague’s (1997) application of the PRECEDE-PROCEED model.....	356
Table 58 Approach to establishing ‘trustworthiness’ of the research findings.....	357
Table 59 Example of key databases consulted for literature review	367
Table 60 Research design attributes identified in the meta analysis of key literature.	367
Table 61 Types of interviews questions (based on Strauss et al., 1964, pp, 26 – 27).....	368
Table 62 Approaches to data representation implemented in the study	369
Table 63 Application of Giddens’ <i>ST</i> (Giddens, 1984, pp.281-28) and Shoib et al.’s (2006) recommendations towards applying Giddens <i>ST</i>	371
Table 64 Approximate participation rates for women working in the ICT, IT and DCI (Australia and internationally from 1997 to 2007).	401

List of Appendices

Appendix 1: Publications stemming from the research.....	350
Appendix 2: Example of literature indicating women are under-represented in the DCI and related ICT industry in Australia and internationally	351
Appendix 3: Examples of strategies fostering women participation	352
Appendix 4: Influences on women’s participation as identified in previous research	353
Appendix 5: Models regarding women’s participation from the ICT literature	355
Appendix 6: Approach to establishing ‘trustworthiness’ of findings	357
Appendix 7: Case study organisation vignettes	358
Appendix 8: Case study and interview protocols	359
Appendix 9: Online questionnaire	363
Appendix 10: Examples of interview question bank.....	364
Appendix 11: Hermeneutic principles applied in the research.....	366
Appendix 12: Giddens’ Model of Interaction (based on Giddens, 1984).....	366
Appendix 13: Search strategy details.....	367
Appendix 14: Example of researcher reflection.....	368
Appendix 15: Methods of data representation used in the current study.....	369
Appendix 16: Reflection on the application of Giddens’ Structuration Theory (ST).....	371
Appendix 17: Secondary sources of data	372
Appendix 18: Approximate participation rates for women working in the ICT, IT and DCI (Australia and internationally from 1997 to 2007).	401

Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Candidate: Anitza A. Geneve

Signature:

A handwritten signature in cursive script that reads "Anitza Geneve". The signature is written in black ink and is positioned to the right of the "Signature:" label.

Date: 24th May 2013

Acknowledgments

“We create society at the same time as we are created by it” (Giddens, 1984, p.14).

“Society is only present in human action, but human action always expresses and utilizes some or other social form” (Bhaskar, 1998, p.36-7).

To my daughter Finn,

The little girl wandered up to her mother, who was sitting in front of a laptop working. With a beaming smile she exclaimed, “Mummy, when I grow up I’m going to make computer games”. Her mother looked at her, first with pride, but this quickly turned to a look of concern. What would this woman’s response to her daughter be? She wanted to say, “Darling, you can do anything you set your mind to”; instead the words, “Sweetheart that’s wonderful (not so believably) ...but along the way there might be things that make it hard,” tumbled out. After a thoughtful pause, the little girl asks, “Like ‘what’ sort of things mummy?”

The mother thinks to herself: What are the obstacles? What first flashes through her mind are the media articles that regularly state that there are fewer women working in the games industry, that it is a male dominated culture, and that a woman in this industry is seen as an exception to the norm. She thinks of the emails she receives from various groups promoting strategies to encourage girls into ICT. She thinks of the academic debates of why there aren’t more women, which range from women just not being suited to technological work, to women being able to do it but being hampered by social expectations or (colloquially) ‘nature vs. nurture’. Slowly, she answers: “Well, sweetheart you will find that there are many things”. Following a moment of silence, the question that every little child asks comes: “But ‘why’ mummy?” The mother answered, “Well, that’s a very good question sweetheart”.

Parents may never know ‘everything’, but I can proudly say that I have contributed to the world that my daughter will grow up in by asking some of the right questions. After spending eight years of my life exploring this question, there is, and I suspect never will be, one answer. Women’s participation in many facets of society remains a complex phenomenon. I have been privileged to share the insights of those passionate women working in the Digital Content Industry. I can say that these women do face obstacles to their participation; however, their individual acts of agency can challenge and transform such constraints. I hope the insights from my research can help industry and our broader society to understand and support such personal agency.

I wish to thank my Principal Supervisor Professor Karen Nelson. Thank you for your support in helping me reach a personal goal that has been so rewarding. I couldn’t have asked for a better supervisor. It’s true: “That which does not kill us makes us stronger” (Nietzsche). I wish to thank my Associate Supervisor Associate Professor Ruth Christie for helping me start the journey. Dr Greg Timbrell’s and Dr Michael Middleton’s involvement as Associate Supervisors was similarly invaluable. Greg’s enthusiasm provided great intellectual energy when needed most and a most memorable quote involving the word theorists’ and Black Sabbath in the same sentence.

Professionally, I would like to thank QUT for supporting my research in the form of a QUTPRA scholarship, and for providing funding for various activities (such as attendance at the Oxford Internet Summer School). QUT supported me not only as a student, but also as a working mother. I would like to thank my fellow colleagues from the

Oxford Internet Institute Summer School of 2009 for their positive feedback. Particular thanks must go to those people in the multimedia and games industry who gave their time and shared their insights. The involvement of the women working in the Digital Content Industry and industry stakeholders has been integral to the research. Thanks must go to Denise Scott who edited the final version of the thesis as per Australian Standards for Editing Practice. Thanks must also go to my employer, Southbank Institute of Technology, who have provided me with the flexibility to complete this study. And finally, thanks must, of course, be offered to the colloquium panel and the final examiners for their collegial insights.

Personally I would like to thank Jill for her editing, my friend Jenine who shared insights from her own PhD journey and other friends for understanding the commitment I have made to complete this research. Finally, thanks must go to my partner Simon, whose ways of supporting me during my research would take half the space of the dissertation if I were to list them all.

There is no one single factor influencing women's participation in the ICT industry

(Trauth and Quesenberry, 2007).

This dissertation, '**Women's Participation in the Australian Digital Content Industry**', reports the investigation into the research problem: Why do women participate in the Australian Digital Content Industry (DCI)? The need to address this research problem arises from the fact that women are currently under-represented in technology-related roles within the DCI workforce, both in Australia and internationally. There are two key research questions the investigation addresses. The first question is: What are the influences on women's participation? The second question is: How can we understand these influences? The research approach captures empirical data that provides insights into the factors influencing women's participation in the Australian DCI.

Over recent decades, academia, government, industry and the media have all asked the question: Why are women under-represented in occupations associated with technology? This question has most often surfaced within the Information and Communication Technology (ICT) research (See the work of Trauth, Quesenberry & Morgan, 2004; Trauth & Quesenberry, 2007; Trauth, 2011). However, despite a body of significant academic research and discussion towards understanding the phenomenon of participation, women continue to participate in inequitable numbers in ICT education and career pathways. A sense of urgency permeates the wider literature, as industry journals announce that "women are fleeing the technical professions" and "deserting IT studies and jobs in droves" (Walters, 2006, p. 26). Hence, the "documented need to study the gender imbalance" that Trauth (2002, p.98) recognised a decade ago, still remains.

There is a similar need to study the gender imbalance in the DCI, an industry of emerging importance within the Australian economy over the last decade (Queensland Government, 2003; Australian Government, 2004; AIMIA, 2005; DCITA, 2005, 2006). The DCI is most readily identified with the production of multimedia interactive content (such as websites, mobile content and augmented reality) and games production (for example: Wii, Playstation and xBox, mobile games and serious games).¹ As Section 2.1.1 explains, the DCI and the ICT industry share similarities. There are overlaps in occupational roles and skills, such as programming, and both extensively draw on technology. Like the ICT industry, the DCI is also characterised by the inequitable participation of women.

¹ In 2007, the Australian Bureau of Statistics (ABS) survey of 'Work in Selected Culture and Leisure Activities' separated games production and website development.

With little empirical or theoretical research of DCI workers' experiences—or, more specifically, of women's experiences—within the DCI, there is a need for continued research efforts. Accordingly, this research aims to contribute to the body of knowledge concerned with women's participation in technology-related industries by investigating the influences on women's participation within the Australian DCI. Influences may include both those that constrain women's participation, and those that foster participation. Understanding influences on women's participation within the Australian DCI may contribute to addressing women's inequitable employment in the industry.

This chapter introduces the researcher's motivation (Section 1.1), the context of the study (Section 1.2), the research problem and questions (Section 1.3), the research approach (Section 1.4), the research contribution (Section 1.5) and an outline of the remaining chapters (Section 1.6).

1.1 PERSONAL MOTIVATION

The impetus for this research gradually evolved from the researcher's personal observations as an educator and freelancer in the multimedia industry over the past two decades. In the mid 1990s, there was an excitement about the technological, social, economic and creative potential on offer in the newly emerging 'new media industry'² However, following this excitement, a concern emerged that women were not entering or remaining in the industry. In the early 2000s, the researcher was actively engaged in encouraging women into vocational educational pathways, and was subsequently recognised for these efforts³ One initiative the researcher was involved in was the Diploma of Multimedia for Women, which was identified by the *Beyond the Pink Collar: Towards Strategies to Respond to Women and Work Issues in Queensland* (Queensland Government, 2001) as a program addressing women's inequitable participation. However, the researcher held some concerns about the program. For example, the females undertaking the program were charged approximately \$500 more than male students enrolled in an almost identical educational program; this extra cost was associated with providing mentoring and role-models for the female students⁴

By the mid 2000s, the researcher observed even fewer women entering the newly emerging games educational programs. For example, in the first two years (2004-2005) of the Diploma of Multimedia (Games Specialisation), not one student was female. The number of female students enrolled in these programs is still low. For example, in July

² The term 'New media' is taken broadly to mean the same as the term 'Digital Content Industry'.

³ For example, the researcher was the recipient of a 2005 Unisys TAFE Equity Outcomes award.

⁴ These costs were associated with the extra support female students received, primarily in the form of guest speakers such as role model Dr Dale Spender. The researcher championed the parity of cost between the Diploma for Multimedia for Women and other non-gendered diplomas. The extra cost had been identified by the female students as adding to the financial burden of undertaking the program.

2011, only 2 of 16 multimedia students and 1 of 20 games students were females. These observations and experiences motivated the researcher to understand the influences on women's participation.

Rather than investigating the participation of students within the education context, the researcher focuses on women in their early careers within the industry context. By focusing on the industry context, the research embraces Consalvo's (2008) approach of exploring the "future workplace for those girls who will be shaping products" (p. 179). The researcher's background as student, freelancer, teacher and role model within the DCI is beneficial to her capacity to undertake this research. Benefits include being able to closely identify with the participants' experiences of the industry context under study. When tempered by the (warranted) critical reflection regarding potential researcher biases, this personal connection strengthens the researcher's insights into the phenomenon.

1.2 CONTEXT

It is important to define the context in which the phenomenon of women's participation manifests. Doing so helps define the boundaries within which findings have application. In light of the research focusing on women's participation in the DCI workforce, it may seem at first that the pertinent contexts are DCI organisations themselves. However, because the causes of women's under-representation may be found in the wider society (Trauth, 2006), there is a need to acknowledge the social and historical characteristics of the broader context within which the DCI operates. Delineation of the social context involves an acknowledgment of societal assumptions surrounding women's capacity for occupational roles, with a shift over the last few decades from women inhabiting the 'domestic sphere' (Becker, 1985, Pocock, 1998, & Alexandrowicz, 2005) to occupying non-traditional occupational roles in workplace contexts. Delineation of the historical context requires "contextualizing how things came to be" (Allen, 2009, p.3)⁵, and a recognition of the salient characteristics of society. One such characteristic is the presence and use of technology, which Negroponte (1999) described as being a key hallmark of contemporary society. Technology warrants specific recognition as the DCI and ICT industries are characterised by their adoption and creation of such technology.

There is no shortage of rhetoric in the academic literature which recognises that technology has been a transformational aspect in people's lives, profoundly changing "the manner in which we work, communicate and cooperate with each other..."(Säljö,

⁵ <http://www.netcrit.net/presentations/oii-summer-doctoral-program-historicising-the-internet-presentation/>

2004, p. 492). Indeed, the previous decade has provided us with significant technological innovation and changing social practices. Social media applications such as Twitter lead us to participate in society via online ‘twittering’, sites such as YouTube form a new model of communication (Bruns, 2008), and Facebook has seemingly become entrenched in everyday life in Australia.⁶ In short, much has changed this past decade in regards to technology innovation and adoption.

The DCI and ICT industries are also industries in which women have historically been, and currently remain, under-represented. In 1967, Seligsohn suggested that Information Technology would be a gender-neutral field unencumbered with historic gender stereotypes. He emphasised that the qualities of problem solving, attention to detail, accuracy and patience were needed in computer programmers—qualities which may even “give the girl programmer an advantage over her male colleagues” (Seligsohn, 1967, p.186). However, in 2003, women represented only approximately 20% of all Queensland⁷ computing professionals (Queensland Government, 2003, p.10). Similarly, research from the United States suggests that computing remains a heavily male-dominated field, even after twenty-five years of extensive efforts to promote female participation (McGrath-Cohoon & Aspray, 2006).

Across the global context, the DCI shares a similar story (as will be further discussed in chapter 2). In 1998, Cassell and Jenkins (1998) in their canonical book, *From Barbie to Mortal Kombat*, raised concerns regarding women’s participation in the computer games industry. Then again in 2008, a decade later, there remained the need to revisit the “debate about how more women could participate in the emerging digital industries” (Jenkins & Cassell, 2008, p. 13). With Australian games development organisations only employing 154 in contrast to 1,277 men, in the 12 month period prior to June 2007, it appears there is indeed a need to ask why more women do not participate. Both the nature of technology and its adoption practices have changed this past decade; however, there is less change evident with respect to women’s equitable participation within the ICT and DCI industries.

Thus the context of the reported research includes; a society where technology and digital products have become more ubiquitous, a culture where women are more likely to be in the workforce, but an emerging industry (DCI) where women are under-represented in Australia. The research seeks to understand why women participate or do not participate in the industry. This is an important question to ask as it has social and

⁶ YouTube <http://www.youtube.com> (began 2005), Twitter <http://www.twitter.com> (began 2006), Facebook <http://www.facebook.com> (began 2004).

⁷ Queensland is a state of Australia

ethical implications, as well as implications for the industry, where gender diversity may improve innovation (as will be discussed in Section 2.3).

1.3 PROBLEM STATEMENT, RESEARCH QUESTIONS AND OBJECTIVES

The **research problem** is: Why do women participate in the Australian Digital Content Industry (DCI)? As will be introduced in Chapters 2 and 3, **two key research questions** can address the research problem.

RQ 1: What are the influences on women's participation in the DCI?

RQ 2: How can the influences on women's participation be understood?

As Chapter 2 discusses, the literature relevant to women's participation in the ICT industry suggests there is a plethora of influences on their participation. These influences include characteristics of the environment (for example, structural) and of the person (for example, psychological). There is, however, a paucity of either conceptual or empirical research regarding the phenomenon of women's participation in the Australian DCI. This paucity of research and the need to identify those influences relevant to the Australian DCI leads to the first research question: What are the influences on women's participation within the DCI? Research Question 1 may be answered with an analysis of empirical data that illuminates the influences experienced by women employed in the DCI. Therefore, the first aim of the research is for an empirically informed rich description of the influences on women's participation within the little-studied context of the Australian DCI.

As Chapter 2 also discusses, influences must be understood in a unified manner, particularly as previous research of women's under-representation in the related ICT industry has been critiqued by Quesenberry (2006) for offering a "wide range of fragmented and difficult to holistically understand findings" (p.343). Concordantly, there has been a call by leading researchers for a greater theoretical understanding of influences. Trauth, Quesenberry and Huang (2009) emphasise that when aiming to understand the complex phenomenon of women's participation in ICT, the core challenge lies in developing a theoretical understanding of the phenomenon; there is, they claim, a "challenge of how to theorize gender under representation" (p. 477). Thus, a second research question emerges: How can we understand the influences on women's participation?

As will be presented in detail in chapter 3, the research approach proposes employing three different frameworks to identify and understand the influences on women's participation in the Australian DCI.

1. Framework 1—a broad analytical framework informed by existing research—proposes three categories of influences: 1) the environment, 2) the person, and 3) the interaction of the environment and person.
2. Framework 2—a theoretical framework informed by existing human agency theories (as a scaffold)—is used to foster further understanding of the environment, person and interaction.
3. Framework 3—an ontological framework informed by Critical Realism—focuses attention on underlying mechanisms involved in interaction.

The frameworks, offering specific concepts for data analysis (as summarised in Table 1), are used to sequentially analyse the empirical data collected as a part of the exploratory case study. The findings reveal the frameworks ultimately foster a unified, empirically informed, theoretical understanding of why women participate in the DCI.

Table 1 Summary of the three frameworks used to analyse the empirical data

Framework	1. Analytical	2. Theoretical	3. Ontological
Basis of concepts in framework	Literature related to phenomenon under study	Four Human Agency theories in the Human Agency Multi-Theory Scaffold (<i>HAMTS</i>)	Critical Realism (specifically, Bhaskar's notion of a stratified reality)
Specific concepts used in data analysis	Three broad concepts 1) Environment (E) 2) Person (P) 3) Interaction (I) of E and P	11 concepts from four agency theories.	Three domains of reality 1) Empirical 2) Actual 3) Real

In addition to the empirical and theoretical insights, findings may have applied outcomes if they can be used to plan, support or evaluate strategies to foster women's participation in the DCI. As is raised in Chapter 3, although such strategies already exist in the ICT context, the efficacy of interventions has been questioned (Craig, Fisher, Forgasz & Lang, 2011). As Trauth et al. (2009) proposed, interventions may benefit from theoretical insights. With this in mind, the research in this dissertation aims to inform such strategies through theoretical insights built on empirical research.

1.4 RESEARCH APPROACH

The research design uses the established research approach of an exploratory case study as a strategy of enquiry. Case study is congruent with the three frameworks, which are used to investigate and understand the empirical data, as it can combine empirical, theoretical and ontological insights to deliver descriptive and explanatory outcomes. The scope of the case study is the experiences of women working in the Australian DCI. The case study involves the collection and analysis of multiple sources of (mostly qualitative)

empirical data from 2007–2011. The primary data source is semi-structured interviews with 18 female, early-career, interactive content creators employed in DCI organisations in Brisbane, Australia. The *Australian Bureau of Statistics* (ABS, 2008a) defines the occupational category of interactive content creators as those involved in ‘designing websites and creating programs that contain film, sound, and animated components for use on computers, electronic games and touch screens’. The case study is underpinned by a Critical Realist philosophy (or ontological stance). This approach is innovative in the sense that there are few examples of empirical Critical Realist case studies, and none applied to research that investigates women’s participation in the DCI.

As Chapter 4 reports, both case study and Critical Realism have limitations for data analysis and the *Six Stage Model of Explanatory Research* (Danermark, Ekstrom, Jakobsen and Karlsson(2002) offers an approach that can strengthen the data analysis. This model is highly congruent with empirical data, the use of existing theory and, importantly, the ontology of Critical Realism. The actual data analysis techniques include those more typical of case study, including qualitative approaches such as hermeneutic analysis, which illuminate less visible influences. Recognition of less readily visible influences is pertinent to research underpinned by Critical Realism, where the ultimate aim is to abstract underlying mechanisms.

The case study is exploratory, in the sense that all three frameworks are guides rather than fixed frameworks. The analytical framework provides three broad categories, and the theoretical framework provides a ‘scaffold’. A scaffold is as Walsham (1995b) and Layder (1998) identified, a guide based on existing theory and not an explicit framework into which data must fit. The ontological framework directs attention to the underlying causal mechanisms at play, which are not predefined. Even the ultimate aim of a causal explanation is, from a Critical Realist perspective, open to fallibility.

Table 2 offers a summary of the key aspects of the research, including: the two research questions that emerge from the review of existing literature (Chapter 2); the three different frameworks guiding data analysis (as detailed in Chapter 3); and the planned methodological approach (discussed in Chapter 4). Added in retrospect, the summary also includes research findings (fully reported in Chapter 5) and the research contributions (fully discussed in Chapter 6).

Table 2 Summary of research questions, aims, approach, and findings

Research Problem			
Why do women participate in the Australian Digital Content Industry (DCI)?			
Research Questions			
1. What are the influences on women's participation in the DCI? 2. How can we understand these influences?			
Gaps to be addressed			
Paucity of empirical/conceptual research within DCI context	Existing research suggests the need to focus on interaction	Research in related domain suggests gender under-representation is under-theorised	Need for insights into multi-level influences from a pluralistic paradigmatic approach
Research Aims			
Gain empirical insights, primarily from female DCI workers' perspective	Identify influences on women in the DCI experience	Move from description to explanation of the phenomenon by drawing on existing theory	Provide (via an ontological stance) explanation through integration of theory and empirical data
Methodological Approach: Three Frameworks			
	<i>Analytical Framework</i> comprised of three broad concepts: Environment(E), Person (P), and (I) Interaction	<i>Theoretical Framework</i> comprised of four agency theories, which form the Human Agency Multi-Theory Scaffold (<i>HAMTS</i>)	<i>Ontological Framework</i> comprised of concepts based on Bhaskar's three 'domains of reality': Empirical, Actual, Real
Methodological Approach: Design and Methods			
Exploratory case study; multiple sources of evidence	Build on existing research	Use of existing theories (more than one) to scaffold the research	Ontological stance draws attention to mechanisms underpinning interaction
Methodological Approach: Logic			
Multiple logic from three frameworks	inductive	abductive	retroductive
Key Outcomes			
Large volume of rich, descriptive empirical data; range of influences identified from the empirical data	<i>Sphere of Influence and Events of Interaction</i> Models guide understanding of empirical data	<i>Multi-Theory Scaffold</i> A typology of theories scaffold empirical research	<i>Five Acts of Agency</i> model offers a conceptual framework of underlying mechanisms and supports the development of the <i>Acts of Agency</i> theory
Key Findings			
Range of influences	Influences include environment (E) and person (P) characteristics; also include events manifesting from the interaction between E and P	Agency theory reveals influences such as a person's self-efficacy; also assists in identifying mechanisms involved in the interaction of influences	Five categories of agent-driven mechanisms offer a way to understand women's participation; the <i>Five Acts of Agency</i> model provides a way to apply or evaluate strategies

1.5 RESEARCH CONTRIBUTION

There are four primary types of contribution emerging from the research: 1) empirical, 2) theoretical, 3) methodological, and 4) applied.

1) **Empirical** insights result from an exploratory case study collecting multiple sources of empirical data. Industry stakeholders and women working in the DCI offer rich descriptive insights of a little-researched context.

2) A **theoretical** contribution emerges from the development of several original models resulting from the analysis of the empirical data and further conceptualisation and theorisation.

3) A **methodological** contribution emerges in two ways. First, the research provides an exemplar of an empirically grounded case study underpinned by a Critical Realist philosophy. Second, the research proposes an original approach to the application of multiple theories as a scaffold.

4) An **applied** contribution emerges from the application of findings to an exploration of existing or potential strategies to address the issue of inequitable women's participation.

In summary, the research is of significant value in the following five ways.

- 1- It is significant to the research community because:
 - a. it adds knowledge to a domain where there is little research
 - b. it draws on both empirical and theoretical insights to develop an emerging theory and associated conceptual models
 - c. it augments the literature on the use of theoretical scaffolds
- 2- It is significant to women working in the DCI because:
 - a. it provides women in the industry with a voice
 - b. it provides insights to support women working in the industry
- 3- The research is significant to the Digital Content Industry because:
 - a. it identifies influences, which industries (that wish to encourage women's entry to the industry and to retain their participation) can take initiatives to address
 - b. it focuses on fostering women's participation which, in turn, can increase workforce diversity and innovation
- 4- It is significant to those practitioners developing and implementing strategies to encourage participation of women in the DCI because:
 - a. it links empirical and theoretical insights to existing strategies
- 5- It is significant to the wider social domain because:
 - a. insights can help to address social inclusion and social equity concerns.

1.6 CHAPTER SUMMARY

This chapter has introduced the research problem, which asks ‘Why do women participate in the Australian DCI?’. Two research questions help to refine the research problem. The two questions essentially ask, 1) what are the influences on women’s participation and 2) how might we understand these influences and ultimately the participation. These are important questions to ask as women are under-represented in the DCI workforce, both in Australia and internationally.

The chapter has introduced the research design by: identifying that an exploratory case study will be utilised; specifying the three frameworks that guide the data analysis, and introducing the data analysis methods suitable for qualitative data. The case study context is the Australian DCI, that is, organisations producing digital products and content; however, context must also consider the wider social setting that the phenomenon is situated within.

This chapter has presented the research in a fairly linear fashion. It may appear that the research design, including the guiding frameworks for analysis, are applied in a structured manner. However, the chapter does not truly indicate the complexity in the overall research process, which has been more cyclical than linear. From the progression of a simple research question of ‘what are the influences’ to the more challenging question of ‘how can we understand these influences’, the process has involved an openness to the data. From the progression of reviewing existing approaches to developing original frameworks, the researcher has faced many analytical challenges. From the progression of the analysis of data to the development of models and an emerging theory, the process has required constant researcher reflection. The research design will be further explained in chapter 3 and 4.

It is hoped that the research approach and findings help to further understand the complex research problem ‘Why do women participate in the Australian DCI’. Chapter 1 has laid the research foundations by providing an overview of the research problem and the approach taken to address the problem. Table 3 outlines the content of the following chapters.

Table 3 Overview of chapters

Chapter/ Key Aspects	Chapter Description
Chapter 1 Introduction	
Establishes research problem	Chapter 1 introduces the proposed research. This includes identifying the research context, aims, questions and methodological approach.
Chapter 2 Women's participation in the DCI	
Reviews previous research	Chapter 2 presents the literature relevant to the research problem and the research issues. Providing an overview of women's participation in the DCI positions the proposed research.
Chapter 3 Ways to understand influences	
Identifies research issues and approach	Chapter 3 presents an argument for the application of three frameworks to analyse empirical data. <ol style="list-style-type: none"> 1. Framework 1: a guiding analytical framework, emerging from existing research 2. Framework 2: a theoretical framework comprised of Human Agency theory concepts. A <i>Multi-Theory Scaffold (MTS)</i> is offered in this chapter as an early contribution. 3. Framework 3: an ontological or philosophical framework comprised of Bhaskar's three domains of a stratified reality: 1) empirical, 2) actual and 3) real.
Chapter 4 Research Approach	
Articulates research methodology	Chapter 4 articulates the methodology with particular reference to the requirements of a case study underpinned by Critical Realism. It is proposed that Danermark et al.'s (2002) <i>Six Stage Model of Explanatory Research</i> can further assist data analysis. The chapter identifies how the research process addresses the research problem in a logical and reliable manner.
Chapter 5 Findings	
Findings, Iterations of data analysis	Chapter 5 reports on three cycles of analysis, where each of the frameworks outlined in Chapter 3 is used to analyse the empirical data. Analysis leads to the proposal of three conceptual models: 1) The <i>Sphere of Influence (Sol)</i> , 2) The <i>Events of Interaction (Eol)</i> , and 3) the <i>Five Acts of Agency (FAA)</i> .
Chapter 6 Discussion	
Synthesis of insights	Chapter 6 discusses the findings and presents the descriptive, theoretical, methodological and explanatory contributions resulting from the research. The models emerging from the research as a contribution are discussed in reference to extant literature and the empirical data. These models include: the <i>Sphere of Influence (Sol)</i> , <i>Events of Interaction (Eol)</i> , <i>Multi-Theory Scaffold (MTS)</i> and subsequent <i>Human Agency Multi-Theory Scaffold (HAMTS)</i> , and <i>Five Acts of Agency (FAA)</i> . These models inform an emerging theory entitled <i>Acts of Agency</i> .
Chapter 7 Conclusions	
Implications	Chapter 7 presents the conclusions of the research in reference to the research problem and questions. The chapter also provides recommendations for future research.

*A literature review is based on the assumption that knowledge accumulates and that we learn from
and build on what others have done (Neuman, 1997).*

The previous chapter introduced the research. This chapter provides a review of the substantive literature relevant to women's participation in the Digital Content Industry (DCI). Section 2.1 discusses the choice of literature used for the literature review. Section 2.2 provides a background to the DCI, highlighting its historical connection to the Information Communication Technology (ICT) Industry. Section 2.3 establishes that women are under-represented in the DCI and considers the impact of this under-representation on society. Section 2.4 introduces the diverse range of influences on women's participation in both the DCI and ICT industries as identified in previous studies. Section 2.5 raises a number of initial methodological concerns raised by the literature with regard to a suitable approach through which to explore and understand women's participation. Accordingly, the chapter concludes with an argument for a particular approach with which to investigate and understand the influences on women's participation. Chapter 3 then details this approach; an approach comprised of three different frameworks to guide data analysis and further theoretical development.

2.1 THE CHOICE OF LITERATURE

The literature review encompasses previous research that reports on women's participation in DCI career pathways; it also encompasses research pertinent to women's participation in the ICT industry. There is a need for both of these research concentrations for two key reasons. First, there is a strong historical connection between the DCI and ICT industries (as noted in Section 2.2). It can therefore be assumed that women in the DCI may face many of the same influences as women in the ICT industry. Second, although there has been a growing body of international research regarding the DCI, there is little research regarding the Australian DCI. There is even less research regarding the under-representation of women with regard to their pathways to employment, their career progression, or their retention in the industry (as will be discussed in full in Section 2.4). In contrast, there have been, and continue to be, a number of collections of high-quality empirical studies related to under-representation of females in the ICT sector, and in the wider context of the Science, Engineering and Technology (SET) industries. Indeed, Trauth et al. (2009) describe the research

concerned with women's participation in the ICT industry as a "volume" (p. 477). Thus, the literature from the ICT field can address the paucity of literature relevant to the DCI.

Trauth et al. (2009) emphasise that the under-representation of women in industries associated with ICT presents researchers with a complex phenomenon. McGrath-Cohoon and Aspray (2006) recognise that the issue of women's equitable participation in Information Technology (IT) is so "complex" that it makes "it difficult to know how to go about reaching a gender balance" (p.viii). Trauth et al. (2009) emphasise that the under-representation of women in industries associated with ICT presents researchers with not only a complex phenomenon, but one that "requires equally complex solutions" (p. 477). Contributing to this complexity is the cross-disciplinary nature of previous research.

Reflecting this complexity, the research approach involves the review of a multi-disciplinary range of literature related to the topic of women's participation. As Table 4 indicates, this literature includes both academic and non-academic sources. Academic literature includes gender-related research (broadly defined as 'feminist research') and ICT socio-technical literature. This academic literature often arises from different schools of thought, and even from competing paradigms. Non-academic literature includes government and industry reports, such as data from the Australian Bureau of Statistics (ABS).

Table 4 Types of literature informing the research

Type	Purpose	Description
Academic literature	Domain-related and topic-related	
	Conceptual research	Studies that formulate emerging concepts, models and frameworks
	Empirical research	Studies with empirical data collection and analysis
	Non-domain or topic-related	
	Wider theoretical frameworks	Theoretical approaches from literature outside of domain; for example, sociology
Non-academic literature	Public domain	Blogs, government reports
	Industry-based	Reports or research from industry, industry websites

Furthermore, women's participation is a sociological concern; thus, the literature extends to domains such as sociology and psychology. A multi-disciplinary approach to the choice of literature is vital for research which aims to understand a complex social phenomenon, such as women's participation, particularly if the aim is to offer insights of value to both the academic community and to industry. As Trauth (2011) reminded us, a research approach encompassing "boundaryless literature searching" is a strength (p.6).

2.2 AN OVERVIEW OF THE AUSTRALIAN DCI

This section provides an overview of the Australian Digital Content Industry (DCI). The term ‘DCI’ does not often appear in the literature; however, it has been used extensively by the Australian Government over the previous decade. Key government reports include the *Australian Digital Content Industry Futures* (DCITA, 2005). Other terms appearing in the literature include ‘digital interactive entertainment’ industry (Martin & Deuze, 2009)⁸ and ‘new media’ (Perrons, 2003a), although the latter term is seen as being contentious (Pratt, 2000).⁹ The DCI is typified by the production of digital cultural artefacts such as websites, mobile content and computer games, with key areas of growth being in the development of games for console formats such as Playstation, Xbox, and Wii (ABS, 2008a). Essentially, the DCI produces digital products and content that are interactive and, in general, utilises technology in the process.

The growth of the Australian DCI continues to be a primary objective for both the Australian Government and the industry itself. In 2005, the Australian Government’s ‘Digital Industry Content Action Agenda’ (*Unlocking the Potential*, DCITA, 2005) estimated the number of employees within Australia’s digital content industry at approximately 300 000. It also reported that the DCI contributed \$A21 billion—almost 3.5 per cent of Gross Domestic Product—to the Australian economy. The agenda anticipated the opportunity for the industry to double in value by 2015. In parallel, Australian society has moved towards the ubiquitous use of digital content as reflected by the uptake of mobile devices, such as smart phones and tablets (Nielsen Online Consumer Report, 2010).¹⁰

There is a strong historical connection between the DCI and the ICT Industry in Australia with considerable overlap across the products produced, the skills required by the industry, and workplace practices. For example, in 2001, a report from the Australian Computer Society (ACS) positioned multimedia and games as a component of the core ICT Industry (See Figure 1). Consequently, much early industry and academic research regarding the DCI has appeared under the ICT umbrella. This is also true for research concerned with women’s participation in the ICT industry. For example, a Queensland-based survey of women in ICT included a number of questions regarding respondents’ experiences with digital media or multimedia (Anderson, Lankshear & Klein, 2006).

⁸ For example, universities offering degree level programs in Games and Interactive Entertainment include Queensland University of Technology.

⁹ These terms are used interchangeably in this dissertation.

¹⁰ http://www.ad-tech.com/sydney_uploads/nielsen_WhitePaper2011.pdf

Thus, the literature regarding women’s participation in the ICT industry is relevant to any study concerned with women’s participation in the DCI.

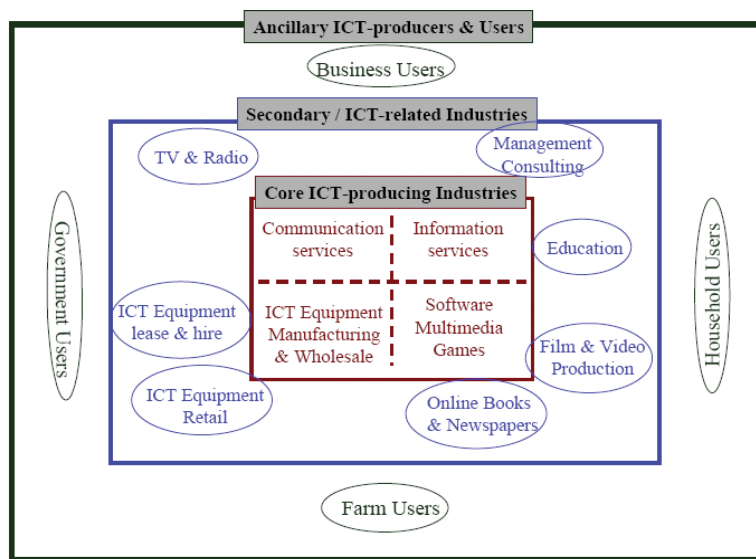


Figure 1: Multimedia and games as a subset of core ICT industries (ACS, 2001; in Houghton, 2001)

The DCI is also associated with the traditional cultural industries. Those working in these cultural industries (Flew & Cunningham, 2010; UNCTAD, 2008) are exemplars of Florida’s (2002) ‘creative class’ (Cunningham, Cutler, Ryan, Hearn & Keane, 2003), and form the creative potential of Australia’s workforce (*Creative Industries, a Strategy for 21st Century Australia*, 2011). Hence, as Figure 2 illustrates, the DCI can be conceptualised as spanning both the ICT and traditional cultural industries. The DCI has “the applications and services components of the ICT industry on the one side and the traditional film, entertainment and cultural industries on the other, and overlapping key areas of both” (DCITA, 2006, p. 8). Consequently, DCI workers require both creative talent and software specific skills (AIMIA, 2005, p. 41; Roan & Whitehouse, 2007).

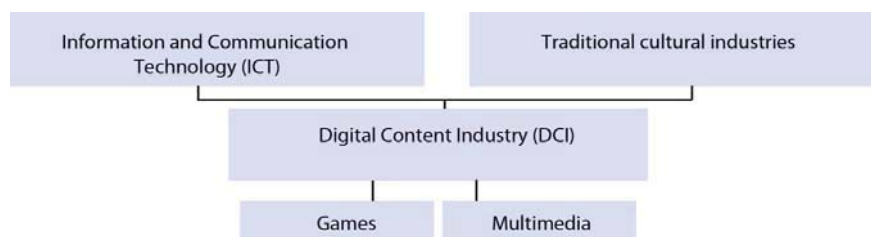


Figure 2: The DCI in relation to the ICT and traditional cultural industries

Occupational roles typically found in the DCI include: web developer, games designer and programmer; less typically roles include audio developer, social media coordinator and graphic designer. There are few guidelines regarding salaries, with there being no specific industrial relations awards. This often leaves for variance in salaries between similar roles and across organisations. However, resources such as the *esalarysurvey* website provide some insight, indicating that the base salary of a junior web developer is \$49,000 (AUD). Recently, a peak industry body, the Digital Industry Association of Australia (AIMIA), conducted salary surveys.¹¹ DCI organisations can range from large multinationals through to a start-up comprised of one to two workers.

Occupational roles in the DCI are difficult to define. In part, this is because roles overlap with other industries (as noted), furthermore many DCI occupational roles have only recently emerged. It was only in 2001, that the Australian Culture and Leisure Classifications (ACLC) defined the key occupational role within the DCI as that of ‘Interactive Content Creator’ (Class 267; Cat. No. 4902.0), which includes those people employed as web designers and games developers (ABS, 2008b; see Appendix 7 for ABS definition). Even the ACLC presents a somewhat out of date listing of the types of digital products an ‘Interactive Content Creator’ may develop; for example, there was no mention of games for mobile phones in 2009. Roles such as ‘social media coordinator’ have only appeared with the advent of social media over the last five years or so.¹² The DCI occupational roles appear to be continuing to emerge.

There is a need for a clearer understanding of the DCI workforce both internationally and in Australia. Although data regarding the participation of Australian DCI workers is for the most part quantitative, there are difficulties in ascertaining precise participation figures for those working in creative industries (Higgs & Cunningham, 2008; Cunningham et al., 2003). Issues regarding quantifying employment numbers are also raised in the United Kingdom (Bakhshi, Freeman & Higgs, 2012; Roodhouse, 2006; Pratt, 2000) and New Zealand (Walton & Duncan, 2002). In addition, quantitative data does not provide insight into the finer nuances of the phenomenon of participation. For example, Table 5 indicates that the first ABS survey of Australian games organisations identified that most workers are employed fulltime. However, these figures do not indicate that full-time employment may only last the life of a specific project production cycle. Deuze, Martin & Allen (2007), for example, noted that employment in games

¹¹ <http://www.esalarysurvey.com> and <http://www.aimia.com.au>

¹² The researcher interviewed a previous student, who now works in the role of social media coordinator. This role did not exist at the time the interviewee was a student.

production is often contingent on the limited life of particular projects. In reference to new media production, Gill (2002) noted that: “lives are organized around projects not careers” (p. 73). Additionally, the extent of the use of contract multimedia workers has differed across work areas such as creative, technical and educational areas (Swanson & Wise, 1996).

All of the above factors—the importance of the Australian DCI, the emerging nature of the DCI, and the limitations of the data about the DCI workforce—suggest that there is a need for its further investigation.

2.3 CURRENT PARTICIPATION OF WOMEN IN THE DCI

The previous section provided an overview of the Australian DCI industry. This section now provides evidence of the phenomenon of women’s under-representation in multimedia and games production organisations in the Australian DCI. This evidence strengthens the argument for further research into women’s participation.

2.3.1 WHAT IS PARTICIPATION

Broadly, ‘participation’ is defined differently across different domains. Participation has been researched in contexts such as adult learning (Cookson, 1986; Scanlan & Darkenwald, 1984), politics (Verba & Nie, 1972), and social inclusion, where inclusion occurs through participation (Saunders, 2002). Theories such as ISSTAL (Smith, 1980; Cookson, 1986; Brown, Grollmann & Tutschner, 2004) aim for an interdisciplinary approach. Another approach to understanding participation lies in labour workforce participation data, where participation is “the extent to which the population is willing and able to work” (Australian Government, 2005a) and participation rates refer to the labour force expressed as a percentage of the population (Australian Government, 2005b). As Table 5 reveals, women’s participation in the DCI may be understood in reference to participation rates in the workforce. Participation can also refer to under-utilised labour (Abhayaratna & Lattimore, 2006).

There are however limitations in understanding participation only in terms of participation rates. Rates themselves do not explain the phenomenon of women’s under-representation in the DCI workforce. Research of women’s participation in the ICT industry proposes that there is a need to look “beyond statistics” (Beekhuyzen & Clayton, 2004, p.4) and “uncover the story beneath” (Trauth & Quesenberry, 2005). This is particularly necessary as “little is known about the challenges these women experience in the workplace in relation to their career stage” (Warne, Bandias, & Fuller, 2011). The

implication for this investigation is that there is a need to collect empirical data which captures rich insights from women working in the DCI, and which can illuminate the story behind the phenomenon.

2.3.2 WOMEN'S INEQUITABLE PARTICIPATION

Women's inequitable participation is not a new phenomenon, having been cited as a concern in the literature of different disciplines, including ICT and gender studies, for a number of decades. Women have historically been under-represented as both users and developers of digital products.

Research in the 1980s and 1990s focused on women's participation as users. Access to technology and digital products such as the internet (Turkle, 1995; Spender, 1995) was a central concern. Even those who heralded interactive computer networks, such as Castells (1996) recognised the digital divide where certain groups, including women, faced inequitable access to these technologies.

This early research also reported the constraints women faced. Cassell and Jenkins (1998) reporting that women were seen as not being users of digital products – 'girls did not play games!' In contrast, recent research indicated a growing parity between genders in the use of digital products such as websites (Women on the Web Report, 2010). With regards to computer and console games, the *Interactive Australia 2009 Report* (Brand, Borchard, & Holmes, 2009) identified "that gamers would be equally female and male by 2010" (p. 16). It appears that women, along with society, have embraced the use of digital products such as games and websites.

A concern remains, however, that women are limited to being consumers rather than creators of technology (Witkowski, 2006). Although the constraints that women face accessing 'cyberspace' have largely disappeared, what remains is a concern that women are still vastly under-represented in the fields that design digital technology (Jenkins & Cassell, 2008). As a female Australian games developer noted, there is "still little female input in games development" (Appendix 17, Item 49). Accordingly, there is a need to consider women's involvement as creators, and not only as users of digital content.

There is ample evidence suggesting that women's participation in the DCI and the ICT industry is not equitable in comparison to men's. Appendix 2 presents previous research that has identified that women are under-represented in ICT careers, and in educational pathways to those careers. Appendix 18, in summarising several sources of information regarding women's participation rates across industries related to

technology, suggests that their participation rates range from 5% to 30% (dependant on the industry sector), both in Australia and internationally. For example, the first study by the International Game Developers Association (IGDA), which surveyed nearly 6500 international games developers, identified women's participation rates of approximately 11.5 % (Gourdin, 2005). A 2006 UK study identified a similar women's participation rate of 12% in computer games development (Pratt, Gill, & Spelthann, 2007).

The *Australian Work in Selected Culture and Leisure Activities Report* (ABS, 2007) identified that there were 62 600 males and 12 800 females in computer games and other interactive software production—a participation rate of approximately 17%.¹³ The inequitable participation rates are most apparent in games organisations. In games development, “male workers almost completely dominate the core content creation roles (such as design, programming and visual arts)” (Deuze et al., 2007, p. 346). The ABS special report *Australian Games Development Industry*, in capturing workforce data for the 2006-07 financial year (ABS, 2008a), showed that of the 1431 persons employed Australia-wide in games development, only 154 were women (Table 5). Therefore, women comprised 10.7% of all games workers in the Australian DCI during that period.¹⁴ As Figure 3 indicates, the State of Queensland employed the greatest number of games workers in Australia in that period. These rates clearly indicate that women are under-represented in the Australian DCI workforce.

Table 5 Game development workers by employment type and gender at end June 2007 (ABS, 2008a)

	Male no.	%	Female	%	Person	%
Working proprietors/ partners/ salaried directors	45	3.5	3	1.9	48	3.4
Other employees						
Permanent full-time	1,188	93.0	137	89.0	1,325	92.6
Permanent part-time	15	1.2	7	4.5	22	1.5
Casuals	29	2.3	7	4.5	36	2.5
<i>Total</i>	<i>1,232</i>	<i>96.5</i>	<i>151</i>	<i>98.1</i>	<i>1,383</i>	<i>96.6</i>
Employment at end June	1,277	100.0	154	100.0	1,431	100.0

Women's participation in multimedia production roles appears to be higher than for games production. In the UK, a survey identified a 38% women's participation rate in web design and special effects. In Australia, the *Work in Selected Culture and Leisure*

¹³ The report notes that the estimate has a relative standard error of 25% to 50% and should be used with caution (ABS, 2007).

¹⁴ It should be noted that there is a discrepancy in the ABS data as the total male workers added to female workers is 1386 and not 1431. Therefore, the suggested participation rate is an approximation.

Activities Report (ABS, 2007) identified 165 000 males and 89 200 females involved in website production—an approximately 35% participation rate. The figures given above, therefore, indicate that women’s participation rates may vary across DCI organisations. The implication for this investigation is that a sampling strategy that captures data from women working in both games and multimedia organisations must be employed.



Figure 1. Number of games development businesses by location, June 2007

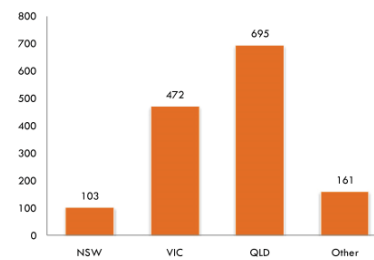


Figure 2. Number of games workers by location, June 2007

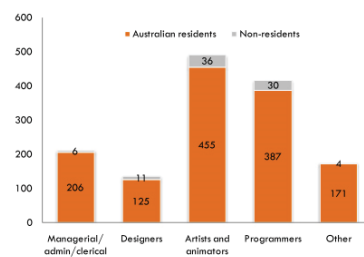


Figure 3. Number of games workers by occupation and residency, June 2007

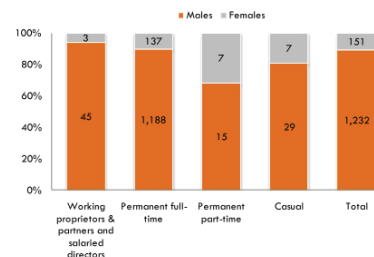


Figure 4. Number of games workers by employment type and gender, June 2007

Figure 3: Games workers’ characteristics in Australia, June 2006-2007(Source: AIMIA, 2011-based on ABS data)

Previous research also indicated that women face horizontal and vertical occupational segregation. Although there were “relatively high numbers of women in ‘web/multimedia’ jobs” in the Australian DCI, many of these appeared to be “primarily clerical jobs”, and “women were rarely found in the more directly technical roles of computer games design” (Roan & Whitehouse, 2007, p. 31). A similar segregation has been identified in the Australian IT industry (Whitehouse & Diamond, 2005), the UK IT industry (Panteli, 2005) and the UK games industry (Prescott & Bogg, 2011). International industry-based research, such as the *American Game Career Guide* (2007), identified that women are under-represented in developmental roles, including programming, and are concentrated in high paying production roles. Thus, women’s participation within the DCI may vary across occupational roles. The implication is that this investigation needs to employ a sampling strategy that recruits women working in a variety of roles within the interactive content creator category.

Industry-based reports indicate that women are particularly under-represented in technical roles. Although there is no definitive definition of what a technical role encompasses, it appears to include the skill set of coding or programming. As Table 6 indicates, ABS figures suggest programming is one of the key roles in games development, with 29.1% of all workers employed as programmers. However, the ABS figures do not indicate the number of women employed in programming roles. As Table 6 shows, an international survey of games production workers suggested that women's participation as programmers may be as low as 5% (Gourdin, 2005). A study of women working in the UK games industry identified that women comprised only 2% of programmers, 3% of audio, 5% of games designers, 8% of production staff, and 9% of artists (Haines, 2004). Thus, women's inequitable participation appears to be most evident in roles related to technical skills. The implication is that this investigation needs to employ a sampling strategy that recruits women employed in technical roles in the DCI.

Table 6 Participation rates of programmers in the Australian and international DCI

Role	No.	%			Male	Female
Other	11	0.8		Ops/IT/HR	53%	47%
Audio technicians	26	1.8		Writing	70%	30%
Technical support	33	2.3		Mkt/PR/Sales	75%	25%
Quality assurance	105	7.3		Production	79%	21%
Designers	136	9.5		QA	87%	13%
Managerial/administrative/clerical	212	14.8		Executive	88%	12%
Programmers	417	29.1		Visual Arts	89%	11%
Artists and animators	491	34.3		Design	90%	10%
Total	1,431	100.0		Audio	90%	10%
				Programming	95%	5%

Left: Participation rates of both men and women in DCI (games) roles in Australia 2006-2007(ABS, 2008a)
Right: International participation rates for games workers by gender and role type (Gourdin, 2005)

2.3.3 WHY PARTICIPATION MATTERS

There are many important reasons why there is a need to understand women's participation in the DCI workforce. In light of women's under-representation, there is the reason of social equity, which assumes each individual is given a fair and equitable chance to pursue their passion. Such concerns of justice and equal opportunity has been raised in the ICT industry (See Barker & Aspray, 2006). Having more women in the industry can also address skills shortages. Indeed, initiatives aiming to foster women's participation in the ICT industry often suggest that greater participation by women may help to address the skill-shortages the ICT industry faces (See, for example, the partICipaTion National ICT Skills Summit issues paper, Queensland Government, 2006a). The *60Sox Report. Vol. 1* (Haukka, 2009) identified that the Australian DCI faces a similar skills shortage, particularly in highly skilled workers. The report suggests

that the “Australian digital content industries often face skills and labour shortages, exacerbated by insufficient supply of high quality industry-ready graduates”(Haukka, 2009, p. 5). However, there has been no call to recruit women as a way to address the skills shortage in the Australian DCI.

These reasons do move beyond arguing simply for equitable workforce numbers to acknowledging the value of having women in the DCI workforce. There is the argument that a diversified workforce leads to greater innovation in both workplace practices and in the types of digital products that are produced. Similarly, the ICT literature proposes that fostering equitable participation of women (and other marginalised groups) may improve workforce diversity and design innovation, including increasing creativity and productivity (Bulkeley, 1995) and usability of products (Sneiderman, 2000). Historically, the games industry had no interest in “thinking seriously about gender” (Jenkins & Cassell, 2008, p. 10) even though a diverse workforce is seen as “important” to its “future success” (Gourdin, 2005, pp. 9–10; Pratt, 2007)¹⁵. These arguments extend to the inclusion of women due to their gender-specific skills, for example their soft skills. However, there is a need to recognise that these gendered skills do not acknowledge the individual differences women possess. These individual differences must be recognised without ascribing them to ‘nature’ (see for example, Trauth, 2002).

There is also the reason that women’s participation may influence the nature of the products produced, although this has been challenged by researchers such as Consalvo (2008). Women’s under-representation as users of digital products, such as games, has been attributed in part to the lack of appeal or suitability of the digital products (Taylor, 2008; Beasley and Standley, 2002; Pham, 2008).¹⁶ Fullerton et al. (2008) suggest that more women entering the industry may foster the development of games that encourage more women players and, consequently, encourage more women into the industry, thus forming the “virtuous cycle” (p.141). That there are fewer women in the DCI workforce may well be influencing the types of digital content produced and this in turn may dissuade girls and women from pursuing careers in the industry. This is a similar argument to the one Wilson (2004) raises for the development of products in the Information Services (IS) sector, where the “technology itself comes to be gendered

¹⁵ Interestingly, although Pratt is an academic, this quote appears in an online magazine (*Computerworld*) article.

¹⁶ Games such as Grand Theft Auto have received considerable media coverage for their violent and negative portrayal of women.

through the process of its design, development and diffusion into organisations and society as a whole” (p.81).

Be it a combination of these reasons, or even other reasons yet to be considered, the current research suggests that there is a need to better understand the phenomenon of women’s participation, particularly at a time when society embraces technology and digital products. Heeter, Egidio, Mishra and Winn and Winn (2009) suggest there may well be a “high social cost” of the “female population not being engaged early in this digital revolution” (p.97).

2.4 INFLUENCES ON WOMEN’S PARTICIPATION

Section 2.3 established that women are under-represented across interactive content creator roles in multimedia and games production organisations within the Australian DCI, particularly in technical roles. The section also identified several reasons why it is important to address the under-representation. This section (2.4) reviews existing literature to provide insights into what the influences on women’s participation are.

A review of a range of literature relevant to the phenomenon of women’s participation in the DCI and ICT identifies a wide range of influences on women’s participation (Appendix 13 provides details of the review procedure.) This review of selected literature served the primary purpose of helping sensitise the researcher to the range of influences that could be expected to surface in the investigation. In addition, the review sensitised the researcher to methodological considerations and research gaps; these are introduced in Section 2.5.

In brief, the review involved searching journal databases for peer reviewed journal papers, using key search terms such as ‘gender, games’.¹⁷ Subsequently, snowball sampling from the citations in key papers used techniques such as backward and forward searches (Levy & Ellis, 2006) to identify research reported at conferences and in lower ranked journals. Characteristics of each paper were captured in a Nvivo¹⁸ project and included the following nodes: 1) influences explicitly identified, 2) empirical or conceptual research, 3) the industry field (for example, ICT, DCI), and 4) the cohort (if an empirical study).

¹⁷ For example, a database such as Ulrich’s indicates if a journal is ‘refereed’ or ‘peer reviewed’
<http://ulrichsweb.serialssolutions.com/>

¹⁸ As is discussed further in chapter 4, Nvivo is a software tool used in data management and analysis

The review process revealed that there are few empirical academic studies specifically investigating women's participation in the DCI. Internationally, the notable exceptions include Gill (2002) who focused on new media; Prescott and Bogg (2010) who focused on games development; Perrons (2007) and Perrons, McDowell, Fagan, Ray and Ward (2007) who focused on new media; and Krotoski (2004) who focused on games. There are only two key Australia-based research papers relevant to women's participation in the DCI. Swanson and Wise's (1996) findings (from a national survey of the patterns of training, skills, income and employment of women working in the multimedia industries) noted that although the industry area was "still" a male-dominated industry, "women stand to gain from their participation in this expanding sector" (p. 3). A decade later, Roan and Whitehouse's (2007) study of DCI organisations in Queensland, Australia, identified that women remain under-represented in multimedia and in the emerging areas of game production. Gill (2002) has suggested, new media workers are "rarely studied" (p.75); it appears, a decade later, that research into female's employment in these areas is even rarer.¹⁹

Although there is limited research within the DCI field, a range of influences on workers participation can be identified. These influences include the characteristics of the environment and the characteristics of the person. Environment-based characteristics include working conditions, workplace culture, and industry practices. For example, in the European context, Gill (2002) identified that the environment characteristics influencing new media workers include the changing patterns of work. Gill (2002) recognised that lifelong employment is no longer the norm; this is, perhaps, best illustrated by Flores and Gray (2000), who stated that the lives of "wired people" are more like collections of short stories than the narrative of a bourgeois novel (pp.23-4). The industry is characterised by periods of intense employment and long hours, followed by quiet periods or periods of unemployment; indeed, Pratt (2000) referred to a career with this pattern as a 'bulimic career'. The environment characteristics that positively encourage participation of both men and women include: the ability to work autonomously with no managerial control, flexible working hours, and intrinsically challenging and fulfilling work (Gill, 2002). However, the same characteristics could add "an individualisation of risk" (Gill, 2002) and this may be a reason why workers leave industry.

¹⁹ In this dissertation, the terms 'DCI worker' and 'new media worker' are interchangeable.

Some influences are more pertinent to women. Recent research regarding women's participation in games development organisations in the United Kingdom identified a range of environment characteristics as constraining women's participation. Bogg and Prescott (2011) proposed that several characteristics of the games industry could lead to an industry typified by young, male, unattached workers. These characteristics include: women's limited networking opportunities and access to mentors and role models, limited flexibility and childcare provision, gender discrimination, gender segregation of the workforce, higher values placed on masculine attributes, a culture of long hours, and the potential need for workers to relocate.

Certain characteristics that may initially appear relevant to either gender require further consideration regarding their influence on women in specific. Gill (2002) recognised that a characteristic such as informality of work practices and relationships could be both a positive characteristic that appeals to workers, and one that can also be a negative characteristic if it contributes to gender inequity. Informality, for example, can lead to environments where women experience inappropriate behaviour from male colleagues. This informality also means that work is often allocated through interpersonal connections, and the male majority could more readily foster these connections. Thus, an influence can be both constraining and supportive.

Resources in the environment, such as digital games, may be particularly pertinent when considering women's participation. For example, having access to resources that foster skill development and an individual's identification with the industry is an important influence for women (Adya & Kasier, 2005). However, resources such as game products may not appeal to women (Klawe, 2002) and certain areas of the DCI, such as games development as seen as creating content for men by men.

The literature indicates that the environment-based influences women face in the ICT and DCI manifest in different contexts, ranging from occupational or workplace contexts to the wider social context. Influences that constrain participation can include culture, which encompasses: general attitudes or values regarding women (Trauth, Quesenberry, & Yeo, 2005); a woman's cultural background (Trauth, Quesenberry, & Huang, 2008); and the organisational culture in which a woman finds herself (Trauth, Quesenberry, & Huang, 2009; Webb & Young, 2005). Organisational culture characteristics, such as the dominant male culture in IT organisations (Webb & Young, 2005 citing von Hellens, Nielsen, & Trauth, 2001) and masculinised workplaces (Griffiths, Moore, & Richardson, 2007), can leave women feeling as though they are in

the gendered minority. Beyond organisational culture lie the societal cultural norms, which include gender and occupational stereotypes that suggest that IT workers are male ‘nerds’ and ‘geeks’, and that these stereotypes ‘turn women off’ seeking IT jobs (Stockdale & Stoney, 2008; MacKnight, 2001). The media play a role in perpetuating these inaccurate gender and occupational stereotypes (Jepson & Perl, 2002). This is so even if the stereotypes are inaccurate, as suggested by Courtney, Lankshear, Anderson and Timms (2009).

In addition to the environmental characteristics, there are also person-based characteristics that influence women’s participation. Although there is less research suggesting that the individual plays a role in their participation, it is evident that individual characteristics are an influence. With reference to factors such as personality, Bogg and Prescott (2012)—in citing Swanson and Woitke, 1997—recognised that barriers to participation can be as much personal, as they are environmental. Personality characteristics such as being strong are seen as important for women working in the IT industry (Trauth et al., 2005; Trauth, Quesenberry, & Yeo, 2008); being ‘strong’ may lead to perseverance in the face of environmental barriers. Cognitive qualities of the individual that may influence a woman’s participation include: personality traits (Trauth, 2002), their actual skill capacity or gaps in experience (Margolis & Fisher, 2002), and their perception of skills capacity or self-efficacy (Hackett, 1995). Motivated individuals with a high sense of self-efficacy could well be more driven to participate than those with low skills or low belief in their skills.

These individual characteristics, such as personality, motivation and self-efficacy, often interact with the environmental influences. There appears to be a complex interaction between influences. For example, environmental characteristics such as financial reward or social benefits may motivate individuals. Yet, McGrath-Cohon and Aspray (2006) found that working in the IT industry was not appealing to women: it was perceived as not offering any social value to society and women wanted careers that made a difference. With regard to motivating workers through extrinsic rewards such as financial reward, the ICT industry offers little incentive, with industry employment often contract-based or volatile (consider, for example, the dot.com crash), which adds to employee insecurity. The implication for this investigation is the need for a research approach that can recognise both environment and person-based influences.

Gill (2010) recognised the role that individuals play in managing their own careers, and described a new media worker’s life as a ‘pitch’—a theme that has appeared

in her earlier (2002) work. Gill also recognised that women face a challenge in reconciling individual discourses that conflict with the sociological patterns of inequity. That is, although women may recognise gender-based inequity, they rationalise their experiences as individual, rather than direct consequences of environmental characteristics. When individualistic understandings dominate sociological ones in this way, disappointing (and even discriminatory) experiences are interpreted as personal failures, or as random events (Gill, 2002). Gill recommended further research to consider why women working in the new media industry do not embrace the gender discourse. Gill's work emphasised two salient points: first that the individual plays a role; and, second, that women in new media do not readily assimilate their experiences to a 'gendered' experience. Gender is a hidden characteristic. As a respondent in a survey conducted by Gill (2002) stated: 'You don't talk about gender if you want to get on'. Gill (2002) suggested that these different perspectives or this evidence leaves the researcher facing a 'tension' when exploring women's inequitable participation. The implication for this investigation is a research approach that is sensitive to gender.

Influences manifest in complex combinations. In the ICT industry-related research, Trauth (2002) suggested it is a combination of individual, institutional and cultural influences that result in women's under-representation in the ICT industry. Similarly, women working in the UK IT industry have identified "a combination of factors", rather than one single reason, as contributing to their leaving the IT industry (DTI, 2005, p.16). An assumption of this investigation is that women in the DCI face a similar range of influences on their participation, and that these environment-based and person-based influences manifest in complex combinations.

This initial review process revealed a number of implications for the research. It is likely that there is no one key influence; rather, there is a diverse range of possible influences on women's participation, which include norms, culture, personality and self-efficacy (as summarised in Appendix 4). There is a need for a research approach that can recognise both environment and person-based influences pertinent to the DCI context, and in a manner that helps us understand their complex relationships whilst being sensitive to gender.

2.5 INITIAL METHODOLOGICAL CONSIDERATIONS

The literature review has raised a number of methodological considerations regarding how influences can be identified and how they can be understood. This section introduces six methodological considerations (as listed below). Chapters 3 and 4 present an in-depth discussion of how these considerations are addressed.

1. Empirical data
2. Non-essentialist approach to gender
3. Multi-level and relational analysis of influences
4. Pluralistic paradigmatic perspective
5. Theoretical understanding of the phenomenon
6. Applied findings

1) EMPIRICAL INSIGHTS

Empirical insights of the phenomenon are required, where these empirical insights stem from the women themselves. As recognised in the ICT-related literature, there is a need for research that explores women's experiences (Adam, Howcroft, & Richardson, 2002). The broader literature recognises a similar need. An international *Women in Technology 2007* report published by WITI (Women in Technology International) and reported in an online magazine *Eweek* notes that "the actual experience of women working in technology is rarely addressed" (Appendix 17, Item 47).²⁰ A focus on participants' perspectives is not because this approach is privileged above others; rather, it is because insights from aware individuals can offer a certain depth to findings. Accordingly, a suitable research approach may be one that employs techniques to capture rich qualitative empirical data from women working in the Australian DCI.

2) AVOIDING ESSENTIALISM

The review of literature suggests that when investigating women's participation, there is a need to avoid essentialist assumptions. Concerns have been raised regarding research that is essentialist towards women (Pini, 2001). Essentialism is the error of assuming that all instances or cases of a phenomenon or entity are the same (Sayer, 2000). Hence, such essentialism may view gender as an immutable or fixed category, where all women are seen as having the same characteristics. This is despite the fact that gender categories are not stable (Connell & Dowsett, 1993), and that the term 'gender' has confusing, almost limitless meanings (Risman, 2004). Trauth (2006) noted that studies underpinned by a positivist paradigm can have an essentialist aspect, particularly

²⁰ <http://www.eweeek.com/c/a/IT-Management/Report-Techs-Gender-Gap-Widened-by-Uninviting-Workplace/>

those studies that investigate women's traits. In contrast, socialisation theories (often associated with a constructivist paradigm) recognise that causes are found in the wider society (Trauth, 2006). However, even socialisation theories can be essentialist if they focus on differences between men and women (Lewis & Simpson, 2007). Trauth's *Individual Differences Theory of Gender and IT (IDT)* (Trauth et al., 2004) responded to such essentialism by focusing on the "differences within rather than between the genders" (Trauth, et al., 2008b, p.26). Trauth et al. (2004) emphasised that women should not be treated as a homogenous group; rather, individual differences in experiences must be recognised. The message for this research is that its approach must avoid essentialism towards gender, or women.

3) MULTI-LEVEL ANALYSIS

As there are a range of potential influences, manifesting across different analytically distinguishable levels, there is a need for multi-level and relational analysis of data. Different levels include the individual, group, macro and micro (Ahuja, 2002). These levels can also be articulated as epidemiological, behavioural and environmental levels (See Teague's 1997 study of women working in the Australian ICT industry).

Macro levels can include organisations and structures, and micro levels can include individual behaviours and perceptions (Klein, Cannella, & Tosi, 1999). However, there are a number of definitions of 'macro' and 'micro' (Ritzer & Smart, 2001; Layder, 2006, p.262); 'micro' can also involve the individual's immediate proximal environment (for example, organisational context), and 'macro' the more distal aspects such as global conditions and wider social structures. Methods used to investigate a phenomenon must be capable of grasping the relationship between the macro and micro elements of social life (Layder, 1993).

Cross-level inference (Gerring, 2007)²¹ may be useful in this regard as this analytical approach can infer influences manifesting at one level as a result of investigation at another level. For example, individual level analysis may provide insight into group and organisation level influences. Although individual women's accounts of participation and influences are central, group level inference aims to synthesise individuals' insights. Seeking patterns at the group level must, however, avoid an essentialist stance towards women. As Connell (1987) suggested, a suitable approach when researching gender is one that conducts research "without collapsing towards

²¹ Although cross-level inference mostly refers to the inference of variables in quantitative research, Gerring (2007) draws attention to its use in case study.

volunteerism and plurism” on one side, or “categorical and biological determinism on the other” (p. 61). There is a need to recognise influences at both the individual level and the ‘women’ group level in a manner that is non-essentialist.

Furthermore, a multi-level approach can help reveal those influences less readily identifiable by observation or analysis of participants’ accounts. In the ICT-related literature, these less readily identifiable influences have been described as latent and covert (Roberston, Newell, Swan, Mathiassen, & Bjerknes, 2001); subtle (Webb & Young, 2005); and implicit in contrast to explicit—where implicit aspects include unstated assumptions, values, and norms (Weisinger & Trauth, 2003, p.27). These unseen influences may contribute to what is metaphorically conceptualised as the “glass ceiling” (Hutlin, 2003; Meyerson, & Fletcher, 2000, p. 127). Recognising less visible influences is pertinent because influences such as gender discrimination may occur in a manner that “people don’t even notice them, let alone question them” (Melymuka, 2000). However, the ‘invisibility’ of such influences presents a challenge to those studying them. Perhaps, this explains Cludt’s (1999) assertion that these influences remain largely unexplored.

Suitable methodological approaches to finding less visible influences include what Trauth and Howcroft (2006) described as “empirical sensitivity” (p. 282). This entails the researcher exploring deeper aspects within the data to recognise these unseen causes; for example, shifting from examining overt discrimination to subtle forms that produce gender inequity. Another approach is offered by Roos and Gatta (2009), who suggest that these subtle forms may be understood as the causal mechanisms that underpin discrimination. Accordingly, methodological approaches that foster multi-level and relational analysis are required. An exploratory approach must initially keep sight of the different levels.

4) PLURALISTIC PARADIGMATIC INSIGHTS

There is a need for pluralistic paradigmatic insights. Previous related studies in the ICT field have utilised positivist, interpretive (associated with social constructivism²²) and critical paradigms. There has been no agreement on which paradigmatic position offers a foundation for researchers investigating women’s participation, but rather, there is a debate akin to the ‘paradigm wars’²³; this, in turn, draws attention to the limitations of certain paradigms. For example, studies arising from

²² ‘Social constructionism’ refers to the development of phenomena relative to social contexts, while ‘social constructivism’ refers to an individual’s making meaning of knowledge relative to social context.

²³ See Clegg and Hardy, 1996 (pp. 5-8) for a succinct review of the ‘paradigm wars’.

a positivists paradigmatic approach may be “essentialist and determinist” (Howcroft & Trauth, 2008, p. 188); thus, previous research has favoured interpretivist approaches. A critical paradigm is seen as offering an alternative to interpretive and positivist approaches (Trauth & Howcroft, 2006; Howcroft & Trauth, 2008).²⁴ Debates indicate that we can understand women’s participation from different paradigmatic perspectives.

Drawing on the broader sociological literature, Layder (1998) suggested that a suitable paradigmatic approach may be one that provides a balance between perspectives. Indeed, the current research climate is conducive to research with a pluralistic approach to paradigmatic stance (Mir & Mir, 2002); consequently, a choice of method is not defined by paradigmatic position (Tashakkori & Teddlie, 2003). Kincheloe (2001) went so far as to claim that the social, cultural, epistemological, and paradigmatic upheavals and alterations of the past few decades leave rigorous researchers with no choice but to embrace such an approach. Perhaps, as Smith (2006) noted, it has become evident that a standard account of the paradigms “suffers from persistent theory-practice inconsistencies” (p. 2). Accordingly, Section 3.3 proposes Critical Realism as a suitable paradigmatic foundation.

5) THEORETICAL UNDERSTANDING

There is a need for a theoretical understanding of the phenomenon of women’s participation in the DCI. As noted earlier, empirical insights are pertinent in light of there being very little previous research in the DCI context. However, theory can help explain empirical insights. Trauth et al. (2004) suggested that one of the “research challenges in studying the under representation of women in the IT field is that of developing appropriate theory to provide a basis for understanding and explanation about this gender balance” (p.114). Any “focus on the collection and analysis of empirical data without the development of an appropriate theory to explain and understand the data” (Trauth et al., 2004, p.114) may result in the phenomenon being under-theorised (Trauth, 2002). There is certainly the need for a theoretical understanding of women’s participation in the DCI.

Theoretical understanding may emerge in three ways. First, theoretical understanding can be a result of empirical data analysis using an inductive logic to develop conceptual and theoretical concepts. Second, a guiding analytical framework from previous research can provide a starting point for inductive analysis. As Rowlands

²⁴ A critical paradigm should not be confused here with the critical realist philosophy.

(2005) proposed, a model emerging from a literature review can inform a “loose conceptual model”, and be used as an “initial coding scheme for the qualitative analysis of data” (p.8). Third, a theoretical understanding can emerge from drawing on existing models or theory to explain empirical data. This approach has featured in previous research in the ICT domain. For example, the *IDT* emerges from empirical studies and draws on a wide range of other theories including: feminist standpoint theory (FST) and poststructuralist feminism (Trauth et al., 2009). Similarly, Oswald’s (2008) empirical study, focusing on stereotypes women encounter due to their gender, proposed the value of models other than those found in the ICT and gender-related literature; thus, they suggested that Lent, Brown and Hackett’s (1994) *Social Cognitive Career Theory* is relevant. Adam, Howcroft and Richardson (2004) identify that few of the studies in the ICT domain use theory to explain findings. However, there are several theories and models that may provide a suitable theoretical perspective, as summarised in Table 7. Accordingly, Section 3.2 explains how both empirical data and existing theory can be used to develop a theoretical understanding of women’s participation in the DCI.

Table 7 Theoretical approaches to explaining influences on women's participation in ICT

Name	Author/ Year	Country	Key points	Cohort	Conceptual/ Empirical/
Individual Differences Theory (IDT)	Trauth, Quesenberry & Morgan (2004)	USA	Typology of factors shaping personal characteristics and environmental factors; key concept of 'Individual Differences'	Women working in ICT	Empirical/ conceptual
	Adya & Kaiser (2005)	USA	Structural, social and individual differences; modified Ahuja's model with addition of Trauth's concept of individual differences	School-aged girls	No empirical application; conceptual (literature review)
Stage-model of barriers	Ahuja (2002)	USA	Social, structural influence; focuses on career choice and continuation	Women working in ICT	Empirical model; no further empirical application
PRECEDE model	Teague (1997)	AU	Personal factors and causes within a framework of 'diagnosis'; for example, social factor	Women working in ICT	Conceptual (health domain theory); no empirical application
	Webb & Young (2005)	AU	Descriptive/conceptual categories, including: - supermum - serendipity - culture	Women working in ICT	Empirical model; no further empirical application
Conceptual framework for studying gender and IS	Wilson (2004)	UK	Combines insights derived from: (1) gender and computing, concerning the differences and inequalities of development and use of IS; (2) gender and society concerning the existence of gendered spheres; (3) studies of gender and organisations concerning the social division of labour; and (4) gender and technology, concerning the masculinity of technology culture.	Women working in IS	Conceptual model, no further empirical application

6) APPLIED FINDINGS

Academic, industry and government literature suggests that a range of strategies have been employed to foster both girls' and women's participation in the ICT industry and, more recently, in the DCI. Table 8 identifies several exemplars of these strategies, and further examples are provided in Appendix 3. The majority of these strategies target school-aged females, and are based on the notion that encouraging young women may translate to a choice to pursue technology-related careers.

There are fewer strategies to foster women's participation once they are in the workforce. In Australia, a small number of ICT organizations, including IBM and DELL, propose best practice—or at least better practice—initiatives.²⁵ These strategies or interventions are not usually rigorously implemented, and there are few evaluations of the efficacy of the intervention (Craig et al., 2011). Strengthening these initiatives may involve the application of theoretical knowledge. Trauth (2011) proposed that there is a “tremendous need for theoretically-informed interventions in order to properly address real-world problems” (p.7). There is a need for “a theory whose constructs can help to explain the gender imbalance in such a way that appropriate interventions based upon them can be developed” (Trauth et al., 2009, p. 493). In other words, a research approach based on empirical data and theoretical insights could offer a way to understand appropriate initiatives.

Table 8 Examples of strategies/initiatives to foster women's participation (a full table with further information is included in Appendix 3)

Strategy /Initiative	Industry ¹	Area ²	Country
WINTIT	ICT	Education (Graduate)	UK, AU
Digital Divas	ICT	Education (K-12)	AU
WIT (WIT, 2006)	ICT/DCI	Industry	UK, AU
IGDA mentorship scheme	DCI (Games)	Industry	USA ³
Technology Takes you Anywhere	ICT/DCI	Education (K-12)	AU
Diploma of Multimedia (Women) ⁴	DCI	Education(Vocational)	AU
Girl Geek Coffee Club	ICT/DCI	Education(Graduate)	AU
Geek Girl Dinners	ICT/DCI	Education, Industry	UK ³
Go GURL	ICT	Education (K-12)	AU
Go Girls, Go for IT	ICT	Education(Graduate)	AU
Women in Games	DCI (Games)	Industry	USA

1 Industries often overlap, 2 does not closely examine sources of funding 3 international strategy 4 last offered as a gender specific program in 2007

²⁵ Dell Australia proposed a pilot 'Women in IT mentoring' program involving five ICT firms and aimed at improving the career progression opportunities for women in the sector.
http://www.minister.dcita.gov.au/media/speeches/participation_summit_2005_opening_address

2.6 CHAPTER SUMMARY

The literature review, so far, has introduced the phenomenon under study, that of women's participation. The review has also introduced the context of the phenomenon—the Australian Digital Content Industry (DCI) (Section 2.2).

Section 2.3 reveals that even though the DCI is a growing industry, women remain under-represented in the industry, both internationally and in Australia. The historical and ongoing under-representation leads to the research problem: Why do women participate in the Australian DCI?

A number of implications for this study emerge from the literature review. The number of women working in multimedia related roles and those in games related roles appears to vary, with there being more women in the multimedia sector. This may be a result of the more recent emergence of the games sector. The implication for this study is that the experiences of both women working in multimedia and games must be investigated.

There also appears to be a segregation of the types of roles, with there being fewer women in technical production roles. Therefore this study aims to investigate the experiences of women employed as interactive content creators (as per the ABS definition), who work in a technical role. Accordingly, this investigation focuses on women working as interactive content creators in technical roles within multimedia and games development organisations.

Section 2.4 identified the paucity of academic research regarding women's participation in the DCI, thus further establishing the need for this investigation. Both the ICT and DCI literature identify a diverse range of possible influences on women's participation. The first research question thus emerges and asks: What are the influences on women's participation in the DCI?

The review identifies that there are a wide range of possible influences on women's participation and these include environmental characteristics (such as the stereotypes women face) and person characteristics (such as personality). These influences may vary across different contexts (for example, multimedia or games organisations) and occupational roles (for example, design or programming). Consequently, there is a need for a research approach that can recognise both environment and person-based influences pertinent to the DCI context, and in a manner that helps us understand their complex relationships whilst being sensitive to gender.

Section 2.5 raised a number of initial methodological considerations regarding the identification and understanding of influences. Accordingly, the second research question asks: How can the influences on women's participation be understood? Previous research, or the gaps in this research, indicate that there is a need for empirical data as there is little in the way of women's experiences. In addition, there is a need for theoretical and explanatory insights to understand this data. The investigation must aim for a non-essentialist approach to understanding women's experiences. A pluralistic paradigmatic approach may be of benefit in light of there being complex, multi-level interactions between possible influences.

As the following chapter (Chapter 3) proposes, these methodological considerations can be addressed, in part, by adopting three frameworks with which to analyse the empirical data. It is proposed that these three frameworks offer a reliable and holistic way to investigate the phenomenon under study.

"Given the complex nature of human behaviour, perhaps the most effective social theories are those that have combined several concepts and/or frameworks in order to understand social phenomena." (Trauth, Quesenberry and Yeo, 2008, p. 11)

As Chapter 2 established, although there is little research regarding the influences on women's participation in the DCI context; previous academic literature indicates that there are a diverse range of influences on women's participation in the ICT industry. There is a need to identify the influences women experience within the DCI context. However, is not enough to identify a disparate range of influences; rather, it is vital that influences be understood in a unified manner. Accordingly, this chapter proposes that three frameworks (as introduced in Chapter 1, Table 2) can assist in the identification and understanding of influences.

Section 3.1 considers the value to the research process of Framework 1, an initial guiding analytical framework comprised of three categories: 1) Environment, 2) Person, and 3) Interaction. Framework 1 acknowledges that there is likely to be an interaction between both the environmental and person characteristics, a key point emerging from the literature review.

Section 3.2 considers the value of Framework 2, a theoretical framework comprised of several Human Agency theories. Framework 2, the *Human Agency Multi-Theory Scaffold (HAMTS)*, acknowledges that although there are likely to be a range of environmental characteristics, that the individual plays an important role in their participation. Framework 2, is a specific example of a *Multi-Theory Scaffold (MTS)*. The *MTS* offers a research approach for using four different types of theory to scaffold or guide the data analysis and theorisation process. **Both the *MTS* and *HAMTS* models emerge as an early research contribution.**

Section 3.3 considers the role of Framework 3, a philosophical or ontological framework based on Critical Realism. Framework 3 offers the philosophical underpinning of the research and ultimately a way to explain the phenomenon under study.

It is proposed that individually these three frameworks assist in both identifying and understanding influences; this, in turn, helps to address the research problem: Why do women participate in the Australian DCI? As this chapter notes, these are not three disparate frameworks, rather in contrast, there is a strong theoretical synergy between the three frameworks.

3.1 FRAMEWORK 1: ANALYTICAL MODEL (E, P, I)

The review of previous research in Chapter 2 raised several methodological considerations, including the need for a research approach that values multi-level analysis of empirical data to identify influences that manifest at different levels; for example, at the person and environment levels. In response, this section proposes an analytical framework for the analysis of empirical data that is comprised of three categories: 1) Environment, 2) Person, and 3) the Interaction of the Environment and Person. The following is an explication of how related literature supports the conceptualisation of Framework 1.

A gap exists in the research for a model that can help explain women's participation. Ahuja (2002) states that: "No definitive work has presented a model that explains the role of women in the field of IT in a comprehensive manner" (p. 21). One important theoretical perspective within the ICT-related research is Trauth's *Individual Differences Theory of Gender and IT (IDT)* (Trauth et al, 2004; Trauth et al., 2005; Trauth, 2002, 2006; Trauth et al., 2009). *IDT* draws attention to the "causes of gender under-representation" that women working in the information technology profession may experience (Trauth et al., 2004, p. 114). *IDT* may provide a suitable starting point for any study interested in women's participation in the ICT industry.

IDT presents a conceptual framework that recognises three main categories of influences: 1) personal, 2) shaping and influencing factors, and 3) the environmental context. As Table 9 indicates, for Trauth et al. (2004), environmental influences include cultural attitudes towards women; personal influences include identity characteristics; and shaping and influencing factors include educational and life experiences of the individual. *IDT* recognises that these influences are constructed at the "individual level of analysis" and, thus, the differences in experiences of participation are in part due to the individual differences among women (Trauth et al., 2004, p.114).

Table 9 Conceptual framework offered by IDT (Trauth et al., 2004; Trauth, et al., 2005)

Category of factor	Construct	Example
Personal Data Descriptive data about the participant	Demographic Data	Age, Ethnicity, Gender, Nationality, Race, Religion, Sexual Orientation
	Lifestyle Data	Children, Family Background, Family Work Background, Spouse/Partner
	Workplace Data	Career Characteristics, Industry Type, Job Title, Technical Level, Type of IT Work
Shaping and influencing factors; personal characteristics and influences experienced by that individual, such as: early experiences with computing, role models, mentors and significant others, significant life experiences	Personal Characteristics	Education, Interests and Abilities, Personality Traits, IT Identity, Gender Identity
	Personal Influences	Exposure to Computing, Educational Experiences, Life Experiences, Role Models and Mentors
Environmental Context; provides context within which the person's responses are situated	Cultural Attitudes and Values	Attitude Toward Women, Women Working, Women Working in IT; Academic Attitudes toward Women (In General, in IT); Workplace Attitudes Toward Women (In General, in IT)
	Geographic Data	Location, Population, History
	Economic Data	Employment Overall, Information Economy Employment

IDT suggests that person factors and environment factors are an influence on women's participation. *IDT* provides a third category that appears to overlap the environmental and person factors; 'shaping and influencing factors' are a "combination of personal characteristics possessed by the individual and influences experienced by the individual" (Trauth et al., 2004a, p.118). This third category in *IDT* importantly draws attention to the interaction of influences. Section 3.1.3 further discusses the need to focus on the interaction of influences.

Although, the *IDT* appeared to offer a useful framework with which to understand the influences on women's participation in the DCI, an original guiding analytical model is proposed for three key reasons. First, the categorisation of several sub-categories of the *IDT* model is questioned. For example, Trauth et al., (2004) position the 'workplace data' construct under the personal category. However, it may be considered that workplace characteristics may also be relevant to environmental context. Thus, the conceptualisation of the *IDT* categories would have required further clarification prior to application in this research. Second, *IDT* does not explicitly focus on interaction as an analytical category, or specify the manner in which this interaction may be conceptualised or explained; this is despite the fact that Trauth et al., (2005) clearly suggest there is a "benefit" in "considering the interaction between constructs" (p. 31) such as gender and geographical location. As Section 3.1.3 emphasises, an

investigation of the interaction of influences is required. Third, as the phenomenon of women's participation in the Australian DCI is under-researched, an exploratory research approach is beneficial. Framework 1 is thus comprised of three categories: 1) Environment, 2) Person, and 3) Interaction between these two. As illustrated in Figure 4, the framework is comprised of three broad categories; this is in contrast to the detailed categories and sub-categories offered by *IDT*. There is, however, a resonance between the categories in Framework 1 and *IDT*, even if the framework does not explicitly draw on *IDT*: both consider the environment and person influences. Framework 1 is used to analyse empirical data.

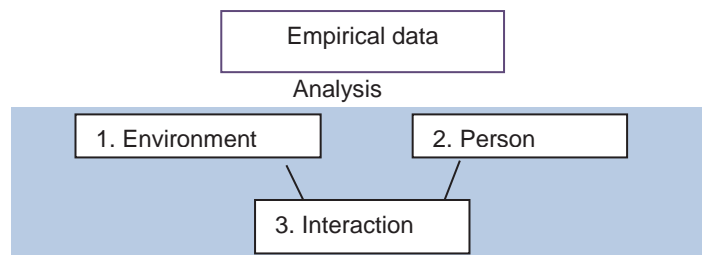


Figure 4: Framework 1: Analytical Framework comprised of three categories (E, P and I)

Further research supports the relevance of the three categories in Framework 1. As summarised in Table 59 in Appendix 4, the existing literature provides multiple examples of influences in both the Environment (E) and Person (P) categories. These influences include:

1. Environment influences, which include structural and social characteristics [Structural characteristics include those of the industry (such as long hours), and artefacts (such as resources, computers, and digital products); social characteristics include cultural, historical, media, and family.]
2. Person influences [These include identity, behaviours, personality traits (such as confidence), skills, and perceptions.]

With regards to the third category (I), although previous research emphasises that an investigation of women's participation must consider the interaction between influences, few studies have explored women's participation by explicitly focusing on the interaction of influences. Influences identified in previous research are now considered with reference to the three categories in Framework 1: Environment (E), Person (P) and Interaction (I) between E and P.

3.1.1 ENVIRONMENT (E) INFLUENCES

The first category in Framework 1 is the Environment (E). Previous research identifies a wide range of environmental characteristics, including structural and social characteristics, which may influence women's participation in the DCI; these structural and social characteristics include workplace practices, culture, social practices, and resources within the environment.

Women's under-representation has been attributed to specific structural characteristics, such as work patterns. For example, the culture of working long hours has been recognised in both the DCI (Gill, 2002) and ICT industry (Ahuja, 2002; Griffiths, Moore, & Richardson, 2007). In DCI organisations, these long hours often manifest near project completion, known as "crunch-time" (Consalvo, 2008; Jenkins & Cassell, 2008, p. 11). In the USA, the games industry has been criticised for work practices that require long hours, and even unpaid hours, as evident in the 2006 EA 'spouse' case in the United States²⁶. Such work patterns may explain why women working in Australian ICT value a flexible work environment (Queensland Government, 2006a)²⁷. However, Roan and Whitehouse's (2007) found that in the Australian DCI context that work hours were regular and reasonably flexible. Therefore, even though a characteristic of the environment, such as long hours, is widely cited as an influence, a suitable research approach must remain open as influences may vary among different environmental contexts.

Although many of these environmental characteristics may influence both female and male DCI workers, certain characteristics may be particularly relevant to women's participation. In the ICT literature, Ahuja (2002) identifies a range of structural barriers pertinent to women, including occupational culture, lack of role models and mentors²⁸, demographic composition and institutional structures. Prescott and Bogg (2010) noted the lack of females, especially females with families, in the gaming industry in the UK games' industry context. Access to childcare has been identified as influencing women's participation in ICT (Queensland Government, 2006b). However, childcare access may be an influence on the participation of either males or females. To suggest that childcare access is an influence only for women is to take an essentialist approach to gender. Essentialism is an assertion that there are fixed, unified and opposed female and male natures (Trauth et al., 2004, citing Wajcman, 1991). Accordingly, a suitable research

²⁶ Stemming from a spouse's posting to a blog, software engineers won a \$14.9 million settlement from Electronic Arts in 2006 for unpaid overtime (See Item 37, Appendix 17: Secondary sources of data).

²⁷ partICipaTion National ICT Skills Summit

²⁸ Agosto, Gasson and Atwood (2008) suggest that a mentor differs from a role model as the former offers personal contact.

approach must initially consider a wide range of environmental influences, not only those that appear (on the surface) to be most relevant to women.

Environmental characteristics that may influence women's participation also include social characteristics of the environment. Trauth's framework (See Table 9), for example, identifies "socio-cultural influences" (Trauth, 2002, p. 98) such as attitudes to women. Other researchers identify social expectations, the work–family conflict, informal networks, and gender stereotypes that surround women (see Ahuja, 2002). Stereotypes include those that suggest women do not have an affinity with technology (Wajcman, 1991). These stereotypes can lead to women feeling as though they are not the 'norm' and that they are "the odd girl out" (Trauth, 2002, p.98). However, recent research suggests that there may be a 'possible shift' occurring in younger people's perceptions of gender stereotyping of ICT-related skills (Trauth, Joshi, Kvasny, Chong, Kulturel, & Mahar, 2010). There are also occupational stereotypes associated with workers, where DCI occupations are seen as 'cool' (Gill, 2002), and ICT roles as being 'geeky' (Beekhuyzen & Clayton, 2004). However, there is a difference between the self-perception of IT workers and their public perception (Courtney, Lankshear, Anderson, & Timms, 2009). These social influences manifest within the organisational and wider social context, including the mass media (Barker & Aspray, 2006). Social characteristics at the organisational level can include organisational culture, which has been perceived as 'chilly' (Roldan, Soe, & Yakura, 2004), 'competitive' (Webb & Young, 2005) and 'hostile' (Griffiths & Moore, 2010). Social characteristics of the environment are worth exploring because participation is a social phenomenon, often involving other people.

Although the review of existing literature draws heavily on the ICT literature, there are some unique aspects of the DCI environment that may influence women's participation, such as the nature of the digital products produced. Games are becoming ever more increasingly popular amongst women in Australia (Brand, Borchard, & Holmes, 2009). However, women's under-representation has been attributed in part to the lack of appeal or suitability of the digital products the DCI produces, where computer games sexualise female characters (Beasley and Standley, 2002), and target content at males (Pham, 2008).²⁹ These game products can "serve as an entry point to the culture of computing and information technology" (Brunner, Bennett, & Honey, 1998, p. 41). Fullerton, Fron, Pearce, and Morie (2008) propose "that women would aspire to be game

²⁹ Games such as Grand Theft Auto have received considerable media coverage for their violent and negative portrayal of women.

designers more frequently if there were more games available that they enjoyed” (p. 165). Thus, resources or artefacts in the environment, such as computer games, may influence women’s participation and warrant investigation.

3.1.2 PERSON (P) INFLUENCES

The second category in Framework 1 is the Person (P). Person characteristics may influence women’s participation. In the ICT context, Trauth’s *IDT* category ‘personal data’ draws attention to a “combination of personal characteristics” of the individual (Trauth et al., 2004, p. 118), which include demographic characteristics such as age and gender (as indicated in Table 9). In addition, the ‘shaping and influencing factors’ that Trauth et al. (2004) propose include personality traits, interests and abilities, and gender and occupational identity. Other research in the ICT domain suggests personal influences may include behaviour (Teague, 1997), and cognitive aspects such as self-efficacy (Adya & Kaiser, 2005; Betz & Hackett, 1997). The role of self-efficacy for women working in the ICT industry continues to draw attention from researchers (Kvasny, Joshi, & Trauth, 2011; Joshi, Kvasny, McPherson, Trauth, Kulturel-Konak, & Mahar, 2010). Thus, existing research suggests that there are a range of person characteristics that may influence women’s participation.

As noted earlier, there is a need for a non-essentialist approach to gender when researching women’s participation. Trauth et al. (2004) highlight the importance of the “individual differences” among women (pp.114-115).³⁰ Recognising individual differences acknowledges both the different circumstances women face (such as the environmental contexts) and women’s individual capabilities and responses. “[Women] do not all experience the same influences, nor do they all respond in the same way” (Trauth, 2002, pp. 114-115). Trauth et al. (2009) suggest that it is these individual characteristics or individual differences that can explain why previous studies present “contradictions” (p. 482) regarding influences. In other words, the influence of environmental characteristics may be dependent on the individual’s response. However, the broader literature notes that characteristics such as individual consciousness are often overlooked when exploring inequity in Australia (Greig, Lewins, & White, 2003, p. 3). Accordingly, the person category must recognise the role the individual woman plays in her participation.

³⁰ Trauth et al. (2004b) note that *IDT* draws on empirical studies and sources that discuss “individual differences”; these include Jennings (1941) who focused on relations between individuals, and McCauley and Thangavelu (1991) who focused on stereotypes.

3.1.3 *INTERACTION (I) BETWEEN THE ENVIRONMENT (E) AND PERSON (P)*

The third category in Framework 1 is Interaction (I); that is, the interaction of the environment and the person. Research in related domains suggests the importance of investigating the interactions among influences. Sociological literature emphasises the need to understand the socially bounded interactions between the environment (for example, other people, social practices, norms and beliefs) and the individual (Layder, 1998). In the domain of career theory, Savickas (2005) states that it is not enough to identify the person (P) and environment (E) influences, or P-E; there is also a need to focus on the “dash” (p.45). In the ICT context, Ahuja (2002) proposes that “social and structural factors as well as their interactions will result in turnover of women in IT” (p.20), and that in order to develop a “rich understanding of IT careers, it is *crucial* [emphasis added] that interactions among these factors be considered” (p. 22). In Australian-based research, von Hellens and Nielsen (2001) propose that there is a need to focus on the “relationships” between the “complex mixture of factors” (p. 52). It is the “understanding of the relationships and interaction of all these factors that holds the key to addressing the declining interest in ICT education and work” (von Hellens, Clayton, Beekhuyzen, & Nielsen, 2009, p. 214).

A handful of empirical studies regarding women’s participation in the ICT industry recognise the relevance of interactions between influences. For example, Adya and Kaiser (2005) recognise the interaction between the individual and the ethnic, social and structural factors that influence career choice. However, few studies investigating women’s participation explicitly consider ‘interaction’ as an analytical object. Trauth’s *IDT* (Trauth et al., 2004, 2005) comes closest, but does not offer an explicit focus on interaction; rather, the category ‘shaping and influencing factors’ implies interaction between certain individual and environmental influences. Trauth et al. (2005) suggest that *IDT* draws attention to interactions among technological, individual and societal forces (p.1). These forces include factors such as individual (for example, parenthood) and organisational (for example, policies and norms), and gender and geographical location. An example of such interaction may be evident in an influence that Trauth et al. (2004) identify as ‘exposure to computing’ (categorised within the ‘shaping and influencing factors’ category), where access to computers (environmental influence) may foster a person’s aptitude for technology (person influence). The implication for this investigation is the need to identify the Environment (E) and Person (P) influences that may contribute to women’s participation and, importantly, to also focus on understanding the Interaction(I) of these influences.

There are several strengths in focusing on the interaction between the environment and person. First, a focus on the interaction among influences may address criticisms that previous studies in the ICT domain face: that they offer a “wide range of fragmented and difficult to holistically understand findings” (Quesenberry, 2006, p.343). Ahuja (2002) argues that it is “not sufficient to examine these factors in isolation from one another, as the IS literature on gender has done so far” (p. 22). Focusing on interaction provides a way to link the seemingly disparate influences across several levels such as structural, social, and individual. A second benefit is that an analytical focus on the interaction recognises that both the environment and the person contribute to an individual’s participation. Neither the environment nor the person are held entirely accountable; both play a role. For example, an influence such as gender stereotypes may manifest in the environment as cultural norms and stereotypes and, in the individual, as second order expectations (Webster and Whitmeyer, 1999). However, the environment may provide role models that help challenge such stereotypes or the individuals themselves may choose to challenge them and transform them in so doing. Thus, a focus on interaction may help tell a more holistic story of women’s participation.

Focusing on interaction also raises the concept of causality. Indeed, in applying *IDT*, Trauth, Quesenberry, and Yeo (2008) use terminology that implies effect; for example, ‘to shape’. This term implies that when aiming for a “deeper examination” of factors, there is a need to recognise “underlying causes of different responses to them” (p. 27). In gender-related studies, a similar call has been made to examine causal effects by investigating mechanisms; that is, any “causal explanation must address how a relationship came about” (Reskin, 2003, p. 16). An approach that considers interaction can illuminate causal effects and can thus add to an overall explanation of influences and the phenomenon of women’s participation.

A consideration of causality may also illuminate temporal aspects of the phenomenon. Previous research identifies a temporal aspect to influences. In the ICT domain, Ahuja (2002) identifies that certain groups of factors are, for example, more influential at different career stages. Gurer and Camp (2002) metaphorically describe the gradual decline in women’s participation as they progress along a school, education and career pathway as the “shrinking pipeline”. The causal effect of influences may vary over time. Accordingly, a focus on the temporal aspect of interactions, or of the temporal context of interactions, can help illuminate influences.

3.1.4 SUMMARY

The review of previous research indicates that the influences on women's participation may be categorised into the two broad categories of Environment and Person. However, a consideration of the interaction between the environment and person is crucial. Accordingly, the research approach has identified an analytical framework comprised of three categories of influences: 1) Environment (E), 2) Person (P), and 3) the Interaction between those two (I). This first framework, Framework 1, serves as an initial guiding analytical framework for the analysis of empirical data, where the aim is to identify and understanding the influences on women's participation.

Framework 1 can help address several of the methodological considerations raised in Section 2.3, as it encourages multi-level analysis of both macro and micro influences (such as structural and individual characteristics). Section 2.3 also raised the need to develop a theoretical understanding of the phenomenon of women's participation. Although this section has introduced possible theoretical approaches from the DCI or ICT literature—for example, Trauth's *IDT*, certain limitations have been noted regarding the suitability of these approaches. Previous research has not had an explicit focus on the interaction between influences. Accordingly, the following section looks to the broader literature for a suitable theoretical perspective that focuses on the interaction between the environment and person, and that can provide an approach through which to understand the phenomenon of women's participation.

3.2 FRAMEWORK 2: THEORETICAL (HUMAN AGENCY THEORY)

Section 2.3 identified the need for a theoretical understanding of the phenomenon of women's participation in the DCI. In response, this section presents three arguments: first, that existing theory is useful in the research process; second, that multiple theories are warranted for the research problem at hand; and third, that Human Agency theories offer a suitable theoretical perspective. Section 3.2.1 considers the methodological concerns of using existing theory in exploratory research, and introduces the approach of using theory as a "scaffold" (Walsham, 1995b; Layder, 1998). Section 3.2.2 provides an original contribution by proposing a *Multi-Theory Scaffold (MTS)*—a model guiding the choice of more than one theory in a scaffold. Section 3.2.3 proposes that Human Agency theory provides a suitable theoretical perspective from which to understand women's participation. Building on the argument in Section 3.2.1—that more than one theory is helpful to the research process—it is proposed that there are four agency theories that can

be used to understand the influences on women's participation. Thus, Section 3.2.4 presents the four Human Agency-related theories that comprise Framework 2. This framework is referred to as the *Human Agency Multi-Theory Scaffold (HAMTS)* from this point on.

3.2.1 THE ROLE OF THEORY

Existing theory can be an important tool in an inductive research process (Walsham, 1995b; Layder, 1998). However, in practice, the use of existing theory is contentious and presents the researcher challenges. Indeed, Sayer (1992) states that “any serious consideration of method in social science quickly runs into basic issues such as the relation between theory and empirical observation and how we conceptualise phenomena” (p. 45). Thus, a critical question arises for this investigation: How can existing theory be utilised in a largely inductive research approach? Inductive referring to what Morse (cited in Tashakkori & Teddlie, 2003) calls the “thrust of discovery” (p.193, 96).

Accordingly, this section considers the role of theory. There are several strengths in using existing theory as a way of understanding the influences on women's participation. This argument can be built on a consideration of Dobson's (1999) suggestion that there are four distinctive approaches for the use of theory in an interpretive, in-depth case study.

1. *No theory*: grounded theory, for example
2. *Single Theory*: where a researcher has an expert understanding of the theory (Alvesson, 1996)
3. *Multiple Theories*: where theory is used as a “scaffold”, to be discarded when no longer needed (Walsham, 1993; 1995b)
4. *Context-dependent use of theory*: theories of a substantive nature

Dobson's observation implies that when considering the use of theory, there are four questions to be considered by the researcher: 1) Will any theory be used at all? 2) Will one or more theories be used? 3) How can theory be used? and 4) Which theory should be used? What follows is a response to these four questions.

In response to the first question—Will any theory be used at all?—there are benefits to be considered. Researchers within the ICT domain suggest that existing theory may be useful in a variety of ways; for example, it may: focus, guide, frame and stimulate theoretical sensitivity by providing concepts and relationships to be ‘checked out against actual data’ (Rowlands, 2003); offer a crafting tool, such as Giddens ST (Shoib, Nandhakumar & Jones, 2006); provide a sensitizing device (Duberley, Mallon & Cohen,

2006); offer a new voice and device to re-author experiences (Alvesson & Kärreman, 2007); help in sensitisation (Walsham, 1995b), analysis (Jones, 1999; Rose, 1998) and theorisation (Jones, 1999); offer a theoretical structure (Stake, 1995) and a set of dispositions or thinking tools (Swartz & Zolberg, 2004). Thus, existing theory can play a range of roles in research.

In response to the second question—Will one or more theories be used?—an argument is put forward for multiple theories. This is because there may be a need for more than one theory due to the complexity of the phenomenon under study. Previous studies in related fields suggest that there are limitations in drawing on a single theory. In the career development field, Super (1992) contends that no one theory in itself is sufficient to adequately address complexity. In the ICT field, Trauth et al. (2004) emphasise that “one of the research challenges in studying the under representation of women in the IT field is the lack of *sufficient* [emphasis added] theory to provide a basis for understanding and explanation about this gender imbalance” (p. 114). Although ‘sufficient’ may refer to the paucity of theories that are available to help understand the phenomenon of women’s participation, it may also be suggestive of a limitation in relying on a single theory to understand a complex phenomenon. Trauth et al. (2008b) suggest that “given the complex nature of human behavior, perhaps the most effective social theories are those that have combined several concepts and/or frameworks in order to understand social phenomena” (p. 11).

Multiple theories can guide a study or offer a theoretical explanation. Rowlands (2005) recommends that empirical research needs to be “guided by (or at least informed by) *one or more* [emphasis added] social theories” (p.87). Walsham (1995b) recommends using multiple theories when conducting case study, not as rivals but to complement each other. Kelle (1995) emphasises that an approach that would use different and even competing theoretical perspectives on the same data is preferred over an “emergence” of theoretical notions from the data. Thus, there are benefits in drawing on multiple existing theories.

In response to the third question—How can theory be used?—there is a need to recognise that the use of theory varies, particularly within qualitative research (Creswell, 2007; Tashakkori & Teddlie, 2003, p.119). Variation surfaces with respect to “when” theory should be introduced (Creswell, 2003, p.134), and a researcher must consider when to most appropriately include theoretical perspectives (Andersen & Kragh, 2009). Some guidance has been provided for interpretive case studies, where it is suggested that

theory may be used: as an initial guide to design and data collection, as part of an iterative process of data collection and analysis (Walsham, 1995b) and as a final product of the research (Eisenhardt, 1989).

One approach to using existing theory is employing theory as a “scaffold” (Walsham, 1995b, p. 76; Layder, 1998, p.150). In using theory as a scaffold, the aim is not to make the data fit to the theory; rather, the theoretical scaffold may be progressively removed, if and when the research no longer requires it (Walsham, 1995b). This use of theory aligns to research that aims to balance empirical insights and prior theoretical knowledge, perhaps to avoid “theoretical over determination and empirical under determination” (Giddens & Turner, 1988, p. 25). The use of theory in this manner is not new; indeed, James noted (in 1907) that theory serves as an instrument and not “answers to enigmas” (James, 1907, p. 46). More recently, Walsham (1993; 1995b) used theory as a scaffold to develop questions used during data collection. Examples of other researchers using existing theory as a scaffold include Orlikowski and Robey (1991) who drew on Giddens’ *Structuration Theory (ST)* (Giddens, 1984).

Theory as a scaffold does not require that an entire theory be applied; rather, select concepts can be used as orienting devices to impose meaningful patterns in a provisional manner (Layder, 1998, p. 109). Indeed, some theories, such as Giddens’ *ST* (1984), may be “too complex, diverse and alien to be adapted wholesale”, and “relevant concepts must be selected and adapted into theoretical frameworks” (Rose & Scheepers, 2001); this is done by using what Jones (1999) describes as a “pick and mix” process. Even Giddens (1984) recognises that the use of concepts from theories may be critical and “selective” (p.43). Thus, employing existing theory as a scaffold entails the select use of relevant concepts.

There are some limitations to consider when drawing on select concepts from a theory or theories. Layder (1998) recognises the possible “damage” caused when the explanatory power of a theory may be impacted by applying single concepts incorrectly, or by the “fragmentary and partial appropriation” (p. 97) of select concepts. Similarly, Craib (1992) has argued that by drawing on several theories, one may lose “vital dimensions of each of them and they cease to do the theoretical work” (p. 63). This is a criticism Craib has specifically directed towards Giddens.

While the researcher must be aware of these limitations, there are also many benefits of employing existing theory as a scaffold when developing and elaborating theory in empirical studies. Layder’s *Adaptive Theory (AT)* (1993, 1998) articulates these

benefits. *AT* builds on the principles of Critical Realism to recommend an approach that entails a blend of inductive and deductive logic. In contrast to traditional inductive research processes, where reasoning is grounded in empirical observations, Layder (1998) sees general and substantive theory as additional “raw material” for theorising (p. 163); thus, the researcher iterates between existing “prior” theoretical materials (p. 166) and emergent empirical data to develop theory, and “theorising is a continuous rather than discrete aspect of the process” (p. 174). The exact form *AT* takes can vary, and it requires a flexible approach to theoretical and empirical resources and methodological strategies and techniques (Layder, 1998, p. 158). However, a key aspect of *AT* is that existing theories do not function as a “ready made” explanation of findings (Layder, 1998, p. 23). Rather, Layder’s (1998) *AT* recognises that the “ransacking” of general theories (p. 164) stimulates analytical thinking so that “good extant ideas” are not “wasted” (p. 114), and that concepts from existing theory offer orientating devices which serve as a means of “cranking up the process of theorising—either by elaborating on extant theory or by generating theory in relation to research evidence” (Layder, 1998, pp.23-24). Thus, employing existing theory as a scaffold entails the use of both empirical data and existing theory for new theory development.

The first three questions proposed in Section 3.2 have now been addressed to establish: that theory is useful, that more than one theory is useful, and that theory can be used as a scaffold. In regards to the fourth question—Which theory should be used?—there is, of course, the need to use those theories appropriate to the research problem, and not simply those which are readily on hand, or popular. To answer this fourth question regarding theory, therefore, there is the need to consider two aspects: the value of different types of theories (to be discussed in Section 3.2.2); and the identification of theoretical perspective suitable for the problem at hand (to be discussed in Section 3.2.4).

3.2.2 *MULTI-THEORY SCAFFOLD (MTS)*

This section considers how different ‘types’ of theory can be used as a scaffold to benefit the research process. Section 3.2.4 will further extend the argument here by illuminating the value of employing different types of agency theory in a scaffold.

Although there have been several significant papers regarding the value of using a “scaffold” (Walsham, 1995b, p. 76; Layder, 1998, p.150), there are few guidelines on the methodological process, particularly if one were to draw on more than one theory. In contrast, when considering theory ‘development’, there is a clear understanding that different types of theoretical outcomes offer different explanations. Established

frameworks that recognise such levels of theorising include Llewellyn's (2003) five ways of theorizing, and Gregor's (2006) five types of theory as an outcome of a study.

Llewellyn (2003) does not specify different types of theory, but rather, ways of theorising to include: 1) metaphor, 2) differentiation, 3) conceptualisation, 4) context free theorising of setting, and 5) context free grand theorising. Llewellyn (2003) does, however, suggest that there are differences in the types of theories one can develop from empirical research by making the distinction that grand theory emphasises structural conditions (p. 677). Gregor's (2006) five types of theory include: 1) theory for analysing, 2) theory for explaining, 3) theory for predicting, 4) theory for explaining and predicting, and 5) theory for design and action. Gregor (2006) provides a clear indication that different types of theories may be developed. However, when drawing on theory as a scaffold, there is no framework to offer guidance on the choice of types of theories.

Dobson (1999) recognises the limited guidance in regards to the choice of theories to be used as a scaffold: "A scaffold is a useful metaphor for theory use but it does not help in defining which theories to use" (Dobson, 1999, p. 264). There is, however, some agreement that different types of theories are useful, especially for further theorising (Layder, 1998; Danermark et al., 2002). Layder (1998) specifically notes the value of general theories, middle range theories and substantive theories. Layder (2006) differentiates that general theory (such as Giddens *ST*) is concerned with generic theoretical problems, whereas substantive theory applies to specific empirical areas (p. 180). Danermark et al. (2002) distinguish four types of theories which may be useful when drawing on theory from an abductive logic: 1) meta theory, 2) normative theory (the way things ought to be and focusing on moral, political and ideological issues), 3) descriptive theories (which describe fundamental properties), and 4) ordering or conceptual frameworks. Although both Layder (1998) and Danermark et al. (2002) make distinctions regarding the value that different types of theory bring to research, neither explicitly states if or how one or more theories may be used in a manner that harnesses different perspectives. **In response, an original contribution is proposed in the form of a conceptual model: the *Multi-Theory Scaffold (MTS)*.**

A *MTS* is an analytical research tool to help the researcher consider the choice of different types of theory for inclusion in a scaffold. In agreement with Danermark et al., (2002) the *MTS* recognises that all theories comprise "abstractions" (p. 126). Different types of theory offer different types of abstraction. For example, general theories differ from other theories because of their "degree of abstraction and thus their apparent

‘distance’ from empirical matters” (Layder, 2006, p. 95). Danermark et al. (2002) suggest that middle range theories may “be abstract enough to enable them to be applied to different social phenomena, and concrete and specific enough to permit testing against empirical data” (p. 126). In contrast to the highly abstract conceptualisations of meta theories (Gregor, 2006), operationalised theories offer a focus on specific measurable variables. Radulescu and Vessey (2009) propose that the use of domain-specific theories may even influence methodological approaches. Thus, the *MTS* is comprised of four types of theory, which may foster deeper insights, as different types of theories offer different levels of abstraction. As Table 10 presents, theories are categorised according to the level of abstraction they offer: 1) meta, 2) critical, 3) middle-range, and 4) operational. The *MTS* is an early contribution resulting from this research.

Table 10 The four types of theory in a *Multi-Theory Scaffold (MTS)*

Type of theory	Analytical value to the scaffold
Meta	A way of thinking about other theories; a high level of abstraction; emphasizes ideas and concepts; includes grand and general theories
Critical	Challenges paradigms and knowledge; sensitises researcher to a particular perspective (for example, emancipation of women, an axiological consideration); heightens researcher reflexivity
Middle range	Links abstract and pragmatic outcomes (meta or theoretical) to operationalised empirical research
Operational	Specifies concepts and relationships as measurable variables

Including the four different types of theory (as proposed in Table 10) in the theoretical scaffold can offer different perspectives to consider during the research process. Theorisation may be stimulated by embracing both similarities and paradoxes in theories. As Poole and van de Ven (1989) have recommended, recognising explanation at different levels and taking advantage of theoretical tensions is useful for theory-building. Just as complementary mixed methods offer more pieces of the puzzle, complementary theories offer a more complete view of the picture.

...because theories may not be applicable as grand concepts explaining all incidents of phenomena, there is also room for simultaneously using more theories to encourage imaginative thinking, even if such theories have conflicting views on the relevance of particular concepts for understanding the issues studied as well as on how such concepts are interrelated. (Anderson & Kragh, 2009, p. 2)

A general discussion of the strengths and weaknesses of each of the four types of theory in the *MTS* now follows. Section 3.2.4 furthers this discussion by illustrating how

different types of Human Agency theory within a *MTS* may be of value in understanding the phenomenon under study.

1) META-THEORY

Meta-theory is a “theory about theories” (Shoib et al., 2006). Gregor (2006) suggests that meta-theory, from a methodological perspective, is “a way of thinking about other theories, possibly across disciplines (p. 616); it may serve as “a theory for understanding” or a “sensitising device” (Gregor, 2006, p. 264). The strength of including a meta-theory in a scaffold is that meta-theories offer an overarching perspective of a study. General and grand theories are similar in the sense that they provide broad explanation (Bacharach, 1989).

The limitations of using a meta-theory is that, like grand and general theory, abstract theories often involve unique concepts and terminology not “easily used in analytical theorizing” (Giddens, 1984, p. 162). Mills (1959) suggests grand theories are so highly abstract³¹ that they are of little or no use in research (Silverman, 2009). However, Layder’s *AT* (1998) contends that there is room in theory use and development for “a co-operative two-way borrowing” between general theory and empirical research (p. 15). The limitation is not that such theory is “disengaged from the ‘real’ empirical world”; rather, because of its high level of abstraction, its relation to the real world is often “oblique and indirect” (Layder, 1998, p. 94).

2) CRITICAL THEORY

Critical theories, most often underpinned by a critical paradigm, include post-modern and poststructuralist theory. However, the term ‘critical’ must be considered (Danermark et al., 2002, pp. 200-201) as its meaning can vary. The term ‘critical’ is often subject to “various interpretations” (Howcroft and Trauth, 2005, p.1) and disciplinary connotations (Mingers, 2000).³² A critical perspective framework has been summarised as: concerned with questioning assumptions; committed to emancipation; taking a social perspective as opposed to an individualised one; and, sensitised to power relations (Burgoyne and Reynold, 1997, cited in Wilson, 2004, p. 83). The inclusion of a critical theory in a scaffold strengthens axiological considerations, which include “ethical and moral questions” (Gregor, 2006, p. 612). For example, feminist critical theory sensitises the researcher to the contingent conditions that women face and raises

³¹ Mills (1959) suggests grand theorists are “drunk on syntax” (p. 34).

³² Critical theorists are often informed by the Frankfurt school, for example, Adorno, Marcuse and Habermas (Hammersley, 1995), and are exemplified by Foucault and critical feminist theorists, including Wajcman (1991).

epistemological considerations such as the value of “seeking knowledge from below” (Calás & Smircich, 2009, p. 265). In the IT research context, Trauth and Howcroft (2006) propose that the objective of critical research about gender and IT is to investigate why gender inequality exists, and to include central themes of emancipation, critique of tradition, critique of technological determinism, and researcher reflexivity. A further strength of critical research is that it can shift the attention from the individual to the broader context of a phenomenon, thus including political, social, and economic considerations (Doolin, 1998).

However, there are several limitations of solely utilising critical theory to scaffold research. Critical theories may be essentialist towards gender if they emphasise divisions (Adam et al., 2004) which may “valorise fixed gender identities” (Halford, Savage, & Witz, 1997, p. 11). Further limitations involve a limited explanatory power due to a focus on the ideological nature of participation, rather than on its empirical outcomes (Trauth & Howcroft, 2006). Hence, critical theory may furnish “surface” investigations, which then become the explanation (Trauth & Howcroft, 2006, p.5); this may lead to discourse rather than explanation (Giddens & Turner, 1988, p. 160). Critical theories may also focus on what is wrong with the world rather than what is right (Walsham, 2006a), thus potentially recognising only the barriers and constraints on, rather than the support of, women’s participation.

3) MIDDLE-RANGE THEORY

What is described as ‘middle-range theory’ (but somewhat differently by Giddens, 1988, p. 82, & Merton, 1967) moves away from the greater level of abstraction of meta or general theory because of its emphasis on “empirical data” and “empiricist epistemology” (Layder, 1998, p. 138). Middle-range theory is thus strongly associated with applied research at the “intersection of practice and research” (Smith and Liehr, 2008, Preface). The strength of including a middle-range theory in a scaffold is that these theories are “concrete enough” to enable tests against empirical data (Danermark et al., 2002, p. 118), and offer a “mid-way between the minor working hypotheses of everyday life and the ‘grand’ theories” (Layder, 1998, p. 16). Thus, a middle-range theory can provide an important link between the meta and operationalised theory in the scaffold.

However, there are also limitations in drawing solely on a middle-range theory. Meta-theory is seen as being difficult to implement within empirical research because of its high level of theoretical abstraction; by contrast, the limitation of middle-range theory is its strong emphasis on empirical insights. Giddens (1988) points out that because

middle-range theories are limited to “a determinate range of conceptual issues” (p. 283), any emerging “empirical generalizations” may still require some abstract formulation to explain them (p. 164). There remains the need to consolidate them into a “progressively more general conceptual scheme” (Giddens, 1988, p. 283). Consequently, the use of a middle-range theory as a scaffold may well require another theory, such as an overarching meta-theory, as a complement.

4) OPERATIONALISED THEORY

Operationalised theories comprise clearly defined constructs, propose measurable concepts, and focus on a limited set of measurable variables when using objective data to predict or confirm the relationship among factors and to test hypotheses or theories.³³ The strength of operationalised theories, as a scaffold, is that they draw attention to specific theoretical concepts and suppositions that can be tested in situated contexts.

There are, however, limitations in drawing on an operationalised theory. Meta- or grand theory suffers from being a monolithic conceptual framework—from being “nothing but theory”; operationalised theories, by contrast, are criticised for providing a too-narrow abstracted empiricism, providing “nothing but statistics” (Mir & Mir, 2002, p. 112). In focusing on a particular set of variables, operationalised theories may lead to the researcher losing sight of the wider social context. As Giddens (1988) proposes, when one starts with particulars, one rarely rises above them (p. 167). In response to such criticisms, operationalised theories have drawn on other theories to broaden their capacity for explanation. For example, *Social Cognitive Career Theory (SCCT)* as an operational theory draws on *Social Cognitive Theory (SCT)*, which is a middle-range theory. The fact that operationalised theories can draw on other theories further strengthens the argument for the use of multiple theories in the *MTS*.

PARADIGMATIC ASSOCIATIONS OF THEORIES IN THE *MTS*

The inclusion of different theories in a *MTS* may raise concerns of paradigmatic commensurability of these theories. The stance taken is that the paradigmatic position of a theory should not constrain its use in the *MTS*. Such a stance recognises the recent “quiet methodological revolution” that has led to a “blurring” in paradigmatic positions (Denzin & Lincoln, 2008, p. vii), and some “commensurability between paradigms” (Guba & Lincoln, 2005, p. 117). By taking an “integrated paradigmatic” approach,

³³ However, it should be noted that several methodologists contend that qualitative data can be used to test hypotheses (s Patton, 1990; Tashakkori & Teddlie, 2003).

theories are not viewed as dualistic or incommensurable, but rather as complementary (Giddens & Turner, 1988, p. 135).

Nevertheless, the use of different theories in the *MTS* must recognise the differences between paradigms because, as Layder (1998) notes, the use of theories can have “antithetical” or “incompatible premises” underlying ontological and epistemological assumptions (p. 135). However, juxtaposing theories from differing paradigmatic stances also has benefits (Anderson & Kragh, 2009). A “multiparadigm approach to theory building can generate more complete knowledge than any single paradigmatic perspective” (Gioia & Pitre, 1990, p. 599). However, the stance taken in this investigation is not multi-paradigmatic as advocated by Mingers (1997), or an ‘anything goes approach’ (Feyerband, 1999). Rather, an acknowledgment of paradigms enables the researcher to embrace the tensions and paradoxes among theories. Embracing paradoxes in a constructive way can lead to the development of new insights (Lewis & Grimes, 1999). Employing a strongly pluralistic approach when choosing theories as a scaffold, may strengthen the research approach.

3.2.3 *HUMAN AGENCY THEORY*

The previous section presented an argument for the use of multiple existing theories as a scaffold, and proposed the *MTS*. This section introduces the theoretical perspective of Human Agency as a way of understanding the problem of women’s participation in the DCI. A *MTS* comprised of four Human Agency theories is proposed in Section 3.2.4. This *Human Agency Multi-Theory Scaffold (HAMTS)* forms Framework 2, the second framework to be used for analysis of the empirical data.

A definition of agency finds it is “slippery” (Hitlin & Elder, 2007, p.170), and the term maintains “elusive, albeit resonant, vagueness” (Emibayer & Mische, 1998, p. 262). In most definitions, agency refers to an individual’s capacity for free will or action, where such human capacity is linked to structural aspects³⁴. A broad range of theorists consider human agency in their work in some form, including Durkheim, Marx, Weber, Goffman, Parson, Mead, and Merleu-Ponty. Theorists with a stronger focus on human agency include Giddens (1979, 1984) and Bandura (2001, 2002a).

In the broader sociological domain, gender-related research has recognised the importance of human agency, where women’s emancipation involves their “individual will and agency” (Connell, 1987, p. 50). Similarly, the literature regarding social

³⁴ The term ‘agency theory’ is not used in the same way as it is in the economics literature (Eisenhardt, 1989b).

exclusion recognises the importance of women's agentic capability (Sen, 2000; Zheng & Walsham, 2008). However, agency theories have not been explicitly used to explore women's participation in the DCI. They may offer a new and relevant approach to the research problem, particularly as they can address several of the methodological concerns raised earlier in Section 2.3. This is because agency theory fosters an exploratory approach, multilevel analysis, and is non-essentialist towards women.

The review of literature suggested the need to recognise the influence of the interaction between the environment and person (See Section 3.1.3). Agency theories recognise a dynamic rather than fixed model of interaction between these two entities. For example, Giddens' theory neither starts from, nor privileges, the subject or society (Walsham, 1993). Similarly, *SCT* recognises that the dynamic "emergent interactive agency" (Bandura, 2001, p.4) will differ based on the individual, the particular behaviour being examined, and the specific situation in which the behaviour occurs (Bandura, 1989a; 1989b). This recognition of the dynamic nature of interaction provides a suitable theoretical approach for exploratory, empirical research.

The review of literature suggested influences manifest over different levels, such as macro and micro (See Section 2.5). Agency theories encourage multi-level analysis, as they consider different levels of influences, including society and the individual. All agency theories are concerned with the reciprocal relationship or interaction between the environment (structure) and the individual (agent), even if different theories emphasise different aspects such as temporality (Emirbayer and Mische, 1998), or the role of the individual's emotions (Archer, 2004). A strength of Giddens' *ST* is that it attempts to reconcile accounts of human agency and social structure in a way that bridges the traditional micro-macro divide, where "studying social interactions in everyday life sheds light on larger social systems and institutions" (Giddens, 1993, pp. 90-91). Indeed, structure and agency may supersede macro and micro levels. As Ritzer and Smart (2001) suggest, what was once "discussed under the rubric of the macro/micro problem is now debated as the problem of structure and agency" (p. 350). Layder (2006) further refines the terminology to suggest that micro-macro indicates the "level of analysis whereas the agency-structure perspective can refer to large and small scale features of social life" (p. 5).

Other theoretical approaches that offer a perspective on the interaction of the environment and person face limitations in their potential to understand both macro and micro aspects. For example, the limitation of drawing on theories arising from a

Symbolic Interactionism (SI)³⁵ perspective is that their focus emphasises micro-level interaction, to the possible detriment of understanding the macro aspects. Layder (2006) suggests it not so much that the focus of SI is on the ‘minutiae’ of interaction, but rather that there is a lack of linkages between the face-to-face interactions with the wider institutional contexts, and that SI may dismiss the “less readily observable” aspects of interaction (Layder, 2006, p. 88). The exploratory research approach adopted in this investigation would ideally, initially, remain open to a wide range of influences.

The review of literature suggested that women’s ‘gendered’ experiences need to be understood in a non-essentialist manner (See Section 2.5). Agency theories offer a way to transcend essentialist gender-based categories by offering a perspective that views participation as an outcome of both individual agency and gender. Gender is not a fixed category, but rather, a way of recognising how individuals are positioned within interaction systems (Giddens, 1984). As Giddens (1993) suggests, simply labelling a person or identifying a “set of characteristics” does not “indicate the process of interaction” (p. 128). Similarly, Bandura (2002b) notes that “there is a substantial difference between theorizing based on categorical cultural trait ascriptions and process analyses” (p. 276).

Even though gender is not the central focus of agency theories, several remain sensitive to gender by recognising that women face certain challenges. Giddens’ *ST* is sympathetic to feminist themes (Mackrell & Nielsen, 2007). Connell (1987) goes so far as to suggest that Giddens’ theory comes closest “to the requirements of a theory of gender” of “all current frameworks for social theory” (p. 94). Giddens (1993) has recognised that the obstacles women face in their careers include employers who discriminate against women, as they believe women will leave the workforce to have babies (p. 245). Similarly, Bandura (2002a) recognises that “socialization practices” “undermine their [women’s and minorities’] efficacy for technological and scientific careers” (p. 6). This is particularly relevant to this investigation as technology features strongly in the DCI context.

³⁵ Symbolic Interactionism includes the original work of Mead, Cooley and Dewey, and later theorists such as Blumer.

3.2.4 A HUMAN AGENCY MULTI-THEORY SCAFFOLD (HAMTS)

Section 3.2.2 established that different types of theory in a scaffold bring a different perspective or level of abstraction to exploring and understanding a phenomenon. This section details the relevance of four agency theories, which will be used to analyse empirical data. As Table 11 illustrates, the four agency theories align to the four types of theories in the *Multi-Theory Scaffold*: meta, critical, middle-range, and operationalized (as detailed in Section 3.2.2). Each of the theories in Table 11 provides concepts that can foster an understanding of the environment and person influences and, importantly, the interaction between the two, to reveal and help understand the influences on women's participation in the DCI. The choice of concepts is initially open, and further refined during analysis as their relevance becomes apparent.

Table 11 Framework 2: the *HAMTS* comprised of four Human Agency-related theories

Type of theory	Specific theory	Domain	Key value to the current case study	Specific concepts that may be useful
Meta	Structuration Theory ST(Giddens, 1984)	Human agency	Provides overarching framework; considers conditions (for example, structures/environment)	Modalities (norms, power, sanctions)
Critical	Social Theory of Gender STG (Connell, 1987)	Gender identity	Heightens researcher's sensitivity to axiological considerations, such as how a particular identity (for example, gender) may experience conditions differently to other identities	Power
Middle range	Social Cognitive Theory SCT (Bandura, 1989b; 1997, 2001)	Human agency, Cognitive Psychology	Emphasises cognitive mechanisms an agent may use when interacting with their environment (such as self-efficacy)	Self-efficacy, disposition, scaffolding, feedback
Operational	Social Cognitive Career Theory SCCT (Lent, Brown and Hackett, 1994)	Human agency, Career theory	Operationalised SCT concepts (such as self-efficacy)	Self-efficacy

As Figure 5 illustrates, the four agency theories form the *HAMTS* (*Human Agency MTS*) form the second framework (Framework 2) used to analyse the empirical data. Although all four theories are related to 'agency', they each offer a different but complementary analytical value in the overall conceptualisation and explanation of the phenomenon. Where a middle range theory—such as Bandura's *SCT*—specifies constructs regarding the role of an individual's cognitive mechanisms (Bandura, 2001), a meta-

```

graph TD
    A[Empirical data] --> B[Analysis]
    B --> C[HA-MTS]
  
```

Giddens' Structuration Theory (*ST*) (1979, 1984) is one of the most widely known agency theories. *ST* offers a highly versatile (Fayolle, 2011) theoretical approach to understanding the everyday interactions between society (which involves the structures and systems of the environment) and the stratified agent (involving the thoughts and actions of the agent) (Giddens, 1988, p. 174).³⁶ Giddens' *ST* encompasses a range of concepts (Shoib et al., 2006). Concepts such as 'duality' have been used to help explain how norms may influence women's participation in IT (Beekhuyzen, Nielsen & von Hellens, 2003), and how mentoring provides a way to challenge structures of signification (von Hellens, Nielson, & Beekhuyzen, 2004). *ST* may offer a similar value in understanding the phenomenon of women's participation in the DCI.

A second model, the *stratification model of the agent* (Giddens, 1984, p. 5) recognises the agent's own awareness where, through reflexive monitoring of action,

Chapter 3. Ways to understand influences **'Women's Participation in the Australian Digital Content Industry'** Author: Anitza Geneve Year: 2013 Page 75 of 401

“agents can explain, both to themselves and to others, why they act as they do by giving reasons for their action” (p. 151). Giddens distinguishes between three levels of consciousness which form a continuum between the unreflective and reflective dimensions of action: the unconscious, practical consciousness (tacit, taken-for-granted knowledge), and discursive consciousness (knowledge/reasons that can be verbally articulated) (Giddens, 1979, p. 56). Thus, *ST* is compatible with a research approach that aims to elicit women’s responses and capture participants’ reflexive knowledge.

It is proposed that Giddens’ *ST* can serve as a meta-theory in the *MTS* employed in Framework 2. As a meta-theory, *ST* offers “a very high level of abstraction” of concepts (Gregor, 2006, p. 616). Indeed, *ST* has faced criticisms regarding its abstract nature and the fact that it provides little real practical guidance (Dobson, 2001b, p. 208). This may explain, in part, comments made by Ramsey and McCorduck (2005) who assert that although *ST* is a “promising” theory with which to understand the problem of the lower rates of participation of women in the IT sector, it is “not mature enough to build a program of action upon” (p.20). Although *ST*, as a meta- theory, may be difficult to apply in an empirical study (Hatch, 1997; Pozzebon & Pinsonneault, 2005), several researchers do offer insight into its application in such studies (Jones, 1999, p. 113; Shoib et al., 2006; Rose, 1998).

Such criticisms strengthen the argument that complementary theories may compensate for the perceived deficiencies of *ST* (Rose, 1998). It would not be judicious to base an exploratory case study solely on this theory. However, aspects of the theory may be useful. As noted earlier, when using theory as scaffold, select concepts may be chosen. Indeed, Layder (2006) specifically suggests that “structuration theory” can be drawn on in “small bits” or “whole chunks”, as a researcher considers them useful in illuminating analysis (p. 156).

2) CRITICAL THEORY: SOCIAL THEORY OF GENDER (STG)

Connell’s (1987) *Social Theory of Gender (STG)* is a social structural theory concerned with gender relationships. Although not explicitly an agency theory, there is significant congruency between Connell’s *STG* and Giddens’ *ST*. Connell’s (2002) contemporary model describes four main, analytically separate, conceptual dimensions of gender—production, power, emotional, and symbolic relations—all concepts presented in Giddens’ theory to some extent.³⁷ This may explain why Connell (1987) highlights that

³⁷ Connell’s later model was modified from the original theory proposed in 1987.

even though no theory of gender has been “couched in these terms”, Giddens offers the “outlines of a solution” to the gender problem (p.62).

It is proposed that Connell’s (1987) STG may serve as a critical theory in the MTS employed in Framework 2. As a critical theory, Connell’s (1987) theory heightens the researcher’s reflexivity and awareness of axiological concerns regarding emancipatory aspects of women’s participation. In particular, STG draws attention to the role of power, an influence identified in previous research in the ICT domain by Trauth and Howcroft (2006). Additionally, as both Connell and Giddens draw attention to the concept of power, STG may provide theoretical triangulation which, as Section 4.4.1 discusses, strengthens theoretical insights.

3) MIDDLE RANGE THEORY: SOCIAL COGNITIVE THEORY (SCT)

Bandura’s (1986) *Social Cognitive Theory (SCT)* is a Human Agency theory that emphasises the role of a person’s cognitive mechanisms. SCT is also often linked to learning theories and the psychology domain (Bandura, 1989b; 2001). SCT emphasises emergent and dynamic interactions resulting from “the dynamic interplay” of three groups of reciprocally determinate influences (Bandura, 1986). Two of these three SCT categories are explicitly congruent with Framework 1 (the analytical framework): the Environment (E), which includes environmental events; and the Person (P), which includes personal factors (cognitive, affective, and biological). The third category in the SCT model includes behavioural patterns (Bandura, 1986, 1999a). Although SCT encompasses several other concepts—including temporal dynamics, fortuitous determinants, and motivation processes—the key focus is on the cognitive mechanisms of the individual, including: motivation and reflexivity (Bandura, 2006); self-efficacy (Bandura, 1997); setting goals (or ‘intentionality’); envisaging outcomes (or ‘forethought’); the ability to react and adapt (or ‘self-reactiveness’) (Donovan, 2001).

It is proposed that Bandura’s SCT (1989b, 1997, 2001) may serve as a middle range theory in the MTS employed in Framework 2. As a middle-range theory, SCT links empirical and theoretical insights. For example, it encompasses concepts from both Giddens’ ST (abstract concepts, such as cultural norms) and Lent et al.’s (1994) SCCT’s operationalised variables (such as self-efficacy). SCT appears to be a useful theoretical perspective; however, few previous studies have explicitly drawn on SCT.

Table 12 provides examples of how several concepts from SCT can help explain previous research regarding women’s participation in the ICT industry. For example, Adya and Kaiser (2005) posit “self-efficacy” (pp. 234, 238, 249, 248) as an important

aspect of girls' participation in ICT. However, they position self-efficacy as an aspect of Trauth's *IDT* (Trauth et al., 2004), rather than Bandura's *SCT*– even though IDT does not explicitly identify self-efficacy as a factor. Similarly, Webb and Young's (2005) findings from a study investigating women's participation in the Tasmanian ICT industry propose a set of themes, several of which, such as skills and serendipity, resonate with *SCT*. Other studies related to the phenomenon of women's participation have drawn on *SCT* directly. These include those concerned with gender related studies (Bussey & Bandura, 1999), with media (Bandura, 2001), and technology (Bandura, 2002). Therefore, *SCT*, as a middle-range theory, appears to offer a relevant scaffold for the phenomenon under study.

Table 12 *SCT* concepts (Bandura, 1997) evident in previous research

SCT	SCT explanation	As evident in previous studies of women's participation in the ICT industries
Environment	The environment provides models; observational learning occurs when a person watches the actions of another person	Positive role models have been cited as being a major factor in young women's career decision-making (Adya & Kaiser, 2005).
	Reinforcements: Responses to a person's behaviour that increase or decrease the likelihood of reoccurrence may promote self-initiated rewards and incentives	Trauth (2002, p.15) speaks of the importance of "selective reinforcement" of messages from society.
Behaviour	Behavioural capability: Knowledge and skill to perform a given behaviour; mastery learning through skills training	Beekhuyzen et al. (2003) identified that it is not a lack of technical skills or ability (or perceived skill), but rather behavioural attributes (perceived confidence or self-efficacy) that hinder participation.
	Expectations: Anticipatory outcomes of a behaviour	"Social and cultural biases" influence "both the internal view that women have of themselves (self expectations) and the external view of women (stereotyping, for example) that is held by society in general" (Ahuja, 2002, p. 22).
Person	Expectancies: The values that the person places on a given outcome; incentives	von Hellens, Nielson, and Beekhuyzen (2003) suggest that the way women talk about their experiences reinforces the stereotypes within the IT industry.
	Self-control: Personal regulation of goal-directed behaviour or performance	Moore, Griffiths and Richardson's (2005a) survey identified the need for "'determination', 'logical', 'persistence'" (p. 18).
	Self-efficacy: The person's confidence in performing a particular behaviour	Trauth (2002, p.109) reported that participants talk about 'inner strength and self-confidence and self-esteem'. Moore et al's. (2005a) survey of women working in IT noted that the women identified the need for "confidence and self belief" (p.18).
	Emotional coping responses: Strategies or tactics that are used by a person to deal with emotional stimuli	Trauth (2002, p.110) identified that women's reactions to barriers varied significantly. Webb and Young (2005) mentioned that other personality traits such as 'adaptability' may be key factors.

4) OPERATIONALISED THEORY: *SOCIAL COGNITIVE CAREER THEORY (SCCT)*

*Social Cognitive Career Theory (SCCT)*³⁸ considers the individual, their context, their development and their interaction (Patton, Bartrum & Creed, 2004) in relation to their interest, career choice, and performance, to explain the development of their career interests and decisions. *SCCT* draws attention to how an individual can exercise personal agency. It focuses on specific mechanisms that shape interests and choices related to entry into, and persistence within, a profession. These mechanisms include self-efficacy beliefs, outcome expectations and goal representations (Lent, Brown, & Hackett, 1994, p. 83). *SCCT* has been empirically supported with a number of studies, including studies of women and ethnic minorities in math, science and engineering (STEM) (Lent, Brown, Schmidt, Brenner, Lyons & Treistman, 2003)³⁹ (Betz and Hackett, 1997) and Information Technology (Smith, 2002).

It is proposed that Lent et al.'s (1994) *SCCT* may serve as an operationalised theory in the *MTS* employed in Framework 2. Like the other theories in the *HAMTS*, *SCCT* positions participation as a result of "person-situation interaction" (Lent et al., 1994, p.82). Person inputs include gender, and the situation or context includes environmental variables such as socioeconomic status. As an operationalised theory, *SCCT* provides a focus on specific constructs identified in the other theories in the *HAMTS*. For example, it is informed by Bandura's (1986; 1989b) *SCT* and, consequently, posits self-efficacy as an important mechanism. *SCCT*, however, offers the researcher an alternative perspective to *SCT* with respect to the causal pathways of certain variables by proposing a greater direct influence of environmental factors (Lent et al., 2003, p. 460). Furthermore, as several *SCCT* variables, such as contextual supports, are reported as understudied (Lent et al., 2003, p. 459), these may be further considered in the current case study if and when the empirical data draws attention to them.

PARADIGMATIC ASSOCIATIONS OF AGENCY THEORIES

As proposed earlier, recognising the paradigms underpinning theories can strengthen the research approach as differences or tensions between the different theories provide points of analytical stimulation. Identifying paradigmatic associations is, however, somewhat subjective on the researcher's behalf, particularly when a paradigmatic stance is not articulated by the originators of the theories. For example, a range of scholars has interpreted the ontological stance and consequent epistemological

³⁸ Although the term 'career' is part of the *SCCT* title, academic interest, choice and performance are also part of the theory.

³⁹ STEM: Science, Technology, Engineering and Mathematics

approach of Giddens' *ST* differently. *ST* is seen as both subjectivist and objectivist; Giddens is identified as both "rooted in a subjective ontology" and in "an interpretive epistemology" (Shoib et al., 2006, p.142); he is also said to be "vehemently opposed" to objectivism, and thus privileging "agents' views at the expense of other perspectives" (Layder, 1998, p.141).⁴⁰ In contrast to this, Giddens has also been labelled a structuralist (Parker, 2000), accused of operating at a "distance" from the hermeneutic task and subjectivism (Calhoun, Gerteis, Moody, Pfaff & Virk, 2002, p. 226). This apparent contradiction may also be a result of the strongly pluralistic nature of Giddens' theory.

3.2.5 SUMMARY

This section has responded to the general call in ICT research for an increased awareness of the role of theory (Weber, 2003a, 2003b; Gregor, 2006). In proposing that a theoretical framework may be beneficial for data analysis, methodological concerns regarding the use of theory have been central. Building on the work of Layder and Walsham regarding using theory as a scaffold, Section 3.2.2 argued for the value of multiple theories in a scaffold and proposed the *Multi-Theory Scaffold (MTS)*. A *MTS* is an analytical tool that asks the researcher to consider the use of four different types of theories in a scaffold; 1) meta, 2) critical, 3) middle-range and 4) operationalized. The argument being that each different type of theory provides a different level of abstraction. The *Multi-Theory Scaffold (MTS)* is an early methodological contribution.

Section 3.2.3 presented an argument for the use of human agency as a specific theoretical perspective with which to understand influences on women's participation. Accordingly, Section 3.2.4 outlined the value of four key agency-related theories. The meta-theory of Giddens' *Structuration Theory (ST)* (1984), the critical theory of Connell's *Social Gender Theory (SGT)* (1987), middle-range theory of Bandura's *Social Cognitive Theory (SCT)* (1986, 1989b) and the operationalised theory of Lent et al *Social Cognitive Career Theory (SCCT)*(1994), as summarised in Table 11. These agency theories form Framework 2: the *Human Agency Multi-Theory Scaffold (HAMTS)*. Thus, the *HAMTS*, is a specific instantiation of a *Multi-Theory Scaffold (MTS)*. Framework 2, provides several benefits in regards to identifying and understanding the influences on women's participation, including a non-essentialist approach towards gender and like Framework 1 offers a focus on the interaction between the environment and person.

⁴⁰ A website that lists resources for qualitative and interpretive research cites Giddens, with a reference to the Constitution of Society: Outline of the Theory of Structure <http://www.qual.auckland.ac.nz/interp.aspx>

This section has articulated the strengths of drawing on multiple agency theories as a theoretical scaffold. However, the methodological approach must also consider ontological underpinnings. Accordingly, the next section presents the argument for a third framework with which to analyse empirical data, a framework stemming from the ontology of Critical Realism.

3.3 FRAMEWORK 3: ONTOLOGICAL (CRITICAL REALISM)

To date, this chapter has outlined the benefit of employing two different frameworks to analyse empirical data; 1) an analytical framework and 2) a theoretical framework. However, research also requires a clear stance on the philosophical basis for making both the epistemological and ontological choices (Wikgren, 2005). Such ontological choices must be made explicit by a researcher (Archer, 1995; Walsham, 1995b). It is proposed that Critical Realism, in particular the ontological approach proffered by Bhaskar (1979; 1986; 1989; 1994), provides a suitable philosophical stance from which to consider the phenomenon of women's participation in the DCI⁴¹. Accordingly, Critical Realism informs the development of the third framework used to analyse empirical data.

3.3.1 A CRITICAL REALIST ONTOLOGY

It is challenging to provide an overview of Critical Realism as it provides different levels of understanding, including: a philosophy of science, a realist social theory, and an explanatory framework (Wikgren, 2005). It can also serve different purposes such as: a philosophical underpinning (Mingers, 2000), a base paradigm (Dobson, Myles, & Jackson, 2007), a philosophical “underlabourer” (Archer, 1998, p. 197)⁴², and an “orientation” (Miles & Huberman, 1994, p. 4).

Although Lopez and Potter (2001) conclude that Critical Realism is not a “homogenous field” (p. 311), but rather a “broad church” (p. 15), there is a general agreement that Critical Realism stems from Bhaskar's (1979; 1986; 1989, 1994) transcendental realist philosophy. However, this research makes little direct reference to Bhaskar's (1978) work or explicitly draws on Bhaskar's (1979) Transformational Model of Social Action (TMSA). The primary reason why Bhaskar is not often directly consulted lies in the difficulty in understanding some of his complex writings. Easton (2009) suggests these may be better understood by drawing on Sayer (1992, 1997, 2000),

⁴¹ 'Critical Realism' is the label most researchers utilise; however, Bhaskar's (1978) own label is “transcendental realism”.

⁴² Bhaskar describes transcendentalism as an ‘underlabourer’.

whose “account of critical realist ontology is the most detailed and comprehensive” (p. 2). Rather than directly referring to Bhaskar, therefore, a range of different authors (such as those presented in Table 13) form the main source of reference regarding Critical Realism.

Table 13 Key Critical Realist authors informing the research approach

Author	As relevant to the current case study
Bhaskar (1979, 1986, 1989, 1994)	Credited with proposing the underlying philosophy; focuses on the researcher's attention on the real, actual, empirical stratified domains of reality
Archer (1995), Archer and Bhaskar (1998)	Builds on Bhaskar's transformational model and emphasises human reflexivity or 'inner conversation' as the central mechanism mediating the influence of objective social and cultural conditions; provides detailed consideration of Bhaskar and Giddens
Sayer (1992, 2000)	Provides pragmatic insights into methodological aspects of Critical Realism
Danermark et al. (2002)	Provides methodological guidance for Critical Realist research in the form of the ' <i>Six Stage Model of Explanation</i> '
Layder (1993, 1998, 2006)	Provides a broadly realist approach to theory use

A distinguishing feature of Critical Realism is the primacy of ontology (Lopez & Potter, 2001, p. 75; Dobson, 1999, p. 265)⁴³, where ontology acts as “both gatekeeper and bouncer for methodology” (Archer, 1995, p. 22). A Critical Realist ontology acknowledges that objects of knowledge exist at two levels, intransitive and transitive (Bhaskar, 1978, 1989; Archer, 1998). The “relatively enduring” world (independent of human beings) is comprised of “intransitive” objects including structures, mechanisms and processes, and events. Intransitive mechanisms generate the actual events that we experience (Lawson, 1997; Mingers, 2004).⁴⁴ Transitive objects consist of an agent's fallible knowledge of the world. The primary aim of Critical Realism is “to explain the relationship between experiences, events and mechanisms” (Jeppson, 2005, p. 5), and the emergent interaction between these, across a stratified reality (Easton, 2009).

There are ‘three domains of reality’: empirical, actual, and real (Bhaskar 1978; Collier, 1994; Sayer, 1992). ‘Empirical’ refers to a person's individual experiences that can be observed and empirically measured; ‘actual’ refers to events themselves, whether experienced or not; and ‘real’ refers to mechanisms, which can only be theorized about and never fully understood (Collier, 1994). As Table 14 indicates, the ‘real’ domain contains mechanisms, events, and experiences—the whole of reality; the ‘actual’ consists

⁴³ Ontology is a branch of philosophy concerned with the nature and essence of things, and asks: ‘What kinds of things are there in the world?’ or ‘What is reality?’ Epistemology is the study of knowledge, and asks: ‘How can things be known?’ or ‘How can we know this reality?’

⁴⁴ This emphasis on ontology may explain why critical realism has also been more narrowly defined as the ontological aspect of a post-positivistic paradigm (Lincoln and Guba, 2000).

of events that do (or do not) occur, and the ‘empirical’ includes those events that are observed or experienced (Mingers, 2004, p.93). Hence, understanding reality involves examining the experiences of people, the events they experience, and the underlying structures and mechanisms that make up the social world (Dobson et al., 2007).

Table 14 Ontological assumptions of the Critical Realist view

	Domain of real	Domain of actual	Domain of empirical	
Experiences	x	x	x	The part of the real and the actual that is experienced by individuals
Events	x	x		The domain of events
Mechanisms	x			The domain of causal tendencies

3.3.2 A CRITICAL REALIST FRAMEWORK

The third framework to be used to analyse empirical data is Framework 3, which is based on the ontology of Critical Realism and is comprised of the three ‘domains of reality’ that Bhaskar (1989) proposes: 1) empirical, 2) actual, and 3) real (as illustrated by Figure 7).

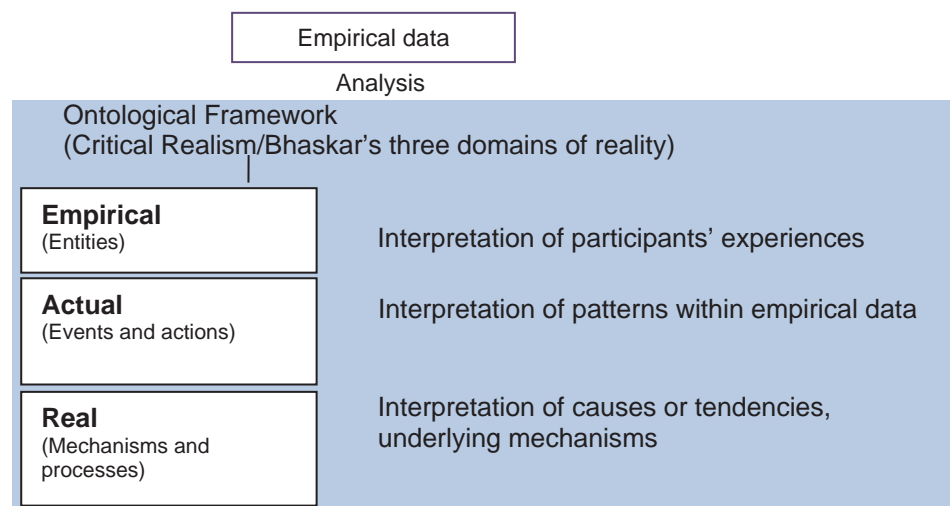


Figure 6: Framework 3: ontological framework comprised of three concepts from Bhaskar's Critical Realist ontology

Framework 3 can address several of the methodological considerations that the review of literature in Chapter 2 introduced. The review of literature suggested that a pluralistic paradigmatic approach would reveal a wider range of influences (See Section 2.5). Critical Realism balances different ontological perspectives by reconciling incompatible ontology's (Carlsson, 2006), and bridging objectivist or subjectivist polarities (Olsen, 2008). Although Critical Realism is offered as an alternative to positivism (Lopez & Potter, 2001) and postmodernism (Archer and Bhaskar, 1998, p. i), and as an intermediate philosophical stance between realism and critical theory (Lincoln

& Guba, 2000), it does not encourage plural ontology's; rather, it encourages differentiated realities (Sayer, 2008).

Critical realism differs from other paradigms more often adopted in previous gender and ICT research, such as social constructionism.⁴⁵ Iconic works, such as *The Social Construction of Reality* (Berger & Luckmann, 1966), do not dispute that interactions occur between the person and their environment, but ontologically believe that they can only be understood from the shared knowledge and individual meanings that people develop from their experiences of interactions. In contrast, for the Critical Realist, social reality is not limited to what people know (Lopez & Potter, 2001, p. 28). Although Varella and Harre (1996) emphasise methodological individualism, rather than attribution of causal powers to social structures, the Critical Realist approach generally aims to avoid a “myopic analytical focus on situated social interaction” to the “detriment of the explanatory power of structure” (Reed, 1997, p. 25). For Critical Realism, the subjective meanings of the person and objective structures both have a causal capacity (Olsen, 2008; Archer, 1995). Thus, Critical Realism's pluralistic paradigmatic approach fosters subjective and objective insights into the phenomenon under study.

The review of literature suggested the need for a multi-level analysis, because there are a diverse range of possible influences on women's participation (See Section 2.5). Critical Realism fosters a multi-level analysis; for the most part, it does this by recognising that reality manifests across its three domains—from the experiences of a person through to the underpinning mechanisms. A Critical Realist perspective involves moving beyond macro and micro distinctions; it does not concentrate solely on a single level of investigation of the society, group or individual. Epistemologically, these levels may include the biological, the psychological, the social, and the cultural (Wikgren, 2005). Furthermore, these levels must be considered from a “relational perspective” (Dobson, 2002), thus acknowledging the interactive nature of society and individual (Archer, 1995; Bhaskar, 1989, 1998; Collier, 1994). A perspective encompassing a stratified reality is seen as providing a greater capacity for explanatory power than the “flat” ontology's (Reed, 1997, p. 24)⁴⁶.

The review of literature also suggested the need for a theoretical understanding of women's participation (See Section 2.5). Critical Realism's emphasis on the need for an

⁴⁵ Social constructionism is typically associated with Papert's learning theory and suggests people learn through interaction; thus, it is described as 'a sociological construct'. Social constructivism is typically associated with interpretive and critical epistemologies as there is an emphasis on how people create their own meaning; thus, it is described as 'a psychological construct'.

⁴⁶ Reed identifies these perspectives as 'ethnomethodology', 'actor-network theory' and 'Foucauldian post-structuralism'.

explanation of the phenomenon through the identification of causal tendencies facilitates the theorisation of “the nature of individuals, the nature of society” and “the nature of their causal interaction” (Sayer, 2000, p. 140). Causal powers or causal liabilities exist across a stratified reality, including human actions and social structures, where a “cause is whatever is responsible for producing change” (Sayer, 2000, p. 94). Critical Realism encourages both a description of the entities involved in the phenomenon—that is, the “characteristics of the interaction of particular kinds of ‘things’”—and an explanation of causal mechanisms underlying that interaction (Lopez & Potter, 2001, p. 11).

This key concern with causality and the identification of the causal mechanisms in social phenomena is the “key” aspect of Critical Realism (Layder, 1993, p. 16). However, the emphasis on generative mechanisms (Bhaskar, 1979, p. 170) is not “cause and effect” in the positivist sense (Mutch, 1997). Rather, Critical Realism recognises that “causal mechanisms do not always generate a particular sort of event”, but that there are “tendencies to interact in certain ways” (Lopez & Potter, 2001, p. 11). Causality is not for prediction; rather, it is a way to illuminate and explain what happens (Ackroyd & Fleetwood, 2000, p. 15). It is from an understanding of this causation that one may build theory (Sayer, 1992; Montona & Szmigin, 2004). Thus, Critical Realism’s focus on underlying mechanisms and causal tendencies can move the research approach beyond description as a sole outcome, towards explanation of the phenomenon.

The review of literature in Chapter 2 further suggested the need for an exploratory research approach. Importantly, Critical Realism provides a clear ontological approach congruent with exploratory research. Critical Realism does not require a decision to be made about what entity or object is central in a study; it does not prescribe which “rocks to look under” (Dobson et al., 2007, p.149). Epistemologically, there is “no objective ‘primacy’ of one factor over others” (McLennan, 1989, p. 263), other than those that have “primacy” as local variables “relative to a specific set of concerns” (McLennan, 1989, p. 32). That is, the only influences that have primacy are those that emerge through the situated interaction under study. Therefore, any explanation depends upon identifying “powerful particulars” from the emergent data (McLennan, 1989, p. 3).

3.3.3 SUMMARY

As Section 3.3.1 introduced, the ontological stance of Critical Realism can offer the underpinning paradigm for an investigation seeking to understand women's participation in the DCI. As Section 3.3.2 presented, Critical Realism provides three specific concepts to be used in Framework 3 when analysing the empirical data; these are the three 'domains of reality' proposed by Bhaskar: 1) empirical; 2) actual; and 3) real (Bhaskar, 1978, 1989; Sayer, 1992, 2000). Like the two other frameworks, Critical Realism encourages a consideration of the interaction between the environment and person. Insights into the 'empirical' domain value the insights that participants have of their experiences. An insight into the 'actual' domain, on the other hand, entails a greater level of supposition from the researcher to identify events that participants experience (be they aware or not aware of the events). Insights into the 'empirical' and 'actual' domain lead to identifying underlying causal mechanisms in the 'real' domain. The identification of mechanisms is a key aim for Critical Realist research, and ultimately, this research focuses on abstracting mechanisms.

3.4 CHAPTER SUMMARY

Chapter 2 established two research questions: 'What are the influences on women's participation in the DCI?' and 'How might we understand these influences?'. It was proposed that analysis of empirical data will reveal the influences, particularly if the data includes rich descriptive insights from women working in the industry. Chapter 3 has proposed that influences may be both identified and understood by employing three frameworks with which to analyse the empirical data: 1) analytical, 2) theoretical, and 3) ontological (as summarised in Table 2).

Section 3.1 identified Framework 1, an analytical framework which emerged from the review of academic and non-academic literature regarding women's participation in the DCI or related ICT industry. The literature suggests that influences manifest across different levels, including: the Environment (E) at both macro (for example, society) and micro (for example, organisational) levels; and the Person (P). However, the interaction of these influences warrants greater attention. Accordingly, there are three categories in Framework 1: 1) Environment (E), 2) Person (P), and 3) the Interaction (I) between the two. Analysis of the empirical data using Framework 1 may assist in identifying and understanding influences.

Section 3.2 identified Framework 2, a theoretical framework comprised of four Human Agency theories, including Giddens' (1984) *Structuration Theory (ST)*, and Bandura's (1984) *Social Cognitive Theory (SCT)*. Agency theories offer a suitable theoretical perspective from which to understand the interaction between the person and the environment. It was argued that the methodological approach of using multiple theories as scaffold, was relevant for the problem at hand (See Section 3.2.2). An early contribution emerged with the explication of the *Multi-Theory Scaffold (MTS)* in Section 3.2.4. The *MTS* provided a tool to help guide the researcher's choice of four theories to scaffold research, where each type of theory provides a different level of abstraction. The choice of the four Human Agency theories lead to the development of the *Human Agency Multi-Theory Scaffold (HAMTS)* that forms Framework 2. Analysis of the empirical data using Framework 2 will assist in identifying and understanding influences.

Section 3.3 identified Framework 3, a philosophical or ontological framework based on Critical Realism. A Critical Realist perspective addresses several of the methodological concerns raised in Chapter 2, such as the need for a pluralistic paradigmatic approach and for multilevel insights into the phenomenon. Furthermore, Critical Realism is compatible with a research approach investigating the environment, the person, and the interaction of the two. Framework 3 entails analysis of empirical data utilising Bhaskar's (1986) 'three domains of reality': 1) empirical, 2) actual, and 3) real. It is expected that analysis of the empirical data using these three concepts, underpinned by a Critical Realist ontology, will assist in identifying and understanding influences.

As will be explained further in Chapter 4 these three frameworks emerged during the research process, they were not developed prior to data collection but rather followed progressively and after initial data analysis. The literature had guided the approach for initial data collection; however, it soon became apparent that frameworks would help both identify influences and offer a way to understand those influences in a holistic manner. This chapter has described each of the frameworks individually; however, the early synergies between the frameworks has been noted. For example, each of the three recognise that there is an interaction between the environment and the individual.

In some ways, the proposed research approach appears complex: it employs three frameworks involving multiple theories, and a pluralistic paradigmatic stance that encourages both subjective and objective insights across multiple levels of analysis. However, it was acknowledged at the start of this chapter that a complex issue such as women's participation may well require complex solutions. What follows from the

review is the need to specify a detailed research approach or plan for the conduct of the research. Accordingly, the following chapter now details this research design.

Table 15 The three frameworks to address methodological concerns

Methodological considerations	Framework 1 Analytical	Framework 2 Human Agency (Theoretical scaffold)	Framework 3 Critical Realism (Ontological)
1. Need for empirical description of influences from women in the industry	Little empirical research in industry context; previous research in ICT identifies need for participants' perspectives	Epistemologically, agency theory sensitive to agent's perspective; for example, <i>ST</i> recommends hermeneutic analysis	Empirical domain of reality values insights from person; values multiple subjective realities, but not limited to it
2. Need for multilevel and relational insights	Existing literature points to relevance of wide range of influences, including Environment and Person	Agency theories encompass wide range of entities, including those identified in previous literature	Considers a broad range of entities and relationships across a stratified reality; comprised of three domains of reality
	Previous research suggests a diverse range of influences across different levels; for example, macro and micro	Acknowledges both structural and individual causal powers at macro and micro, environment and individual levels	Focus on both objective and subjective insights, including influences participants are not aware of
3. Non-essentialist approach to gender		Focus primarily on the individual agent, while remaining sensitive to gender	
Need to explore interaction between influences	Although interaction seen as crucial, literature not clear on how to conceptualise interactions	Agency theorists such as Giddens and Bandura provide models of interaction; Interaction itself seen as emergent	Critical Realism provides ontological/ epistemological framework to explore interaction; Identification of causal tendencies in interaction
4. Pluralistic paradigmatic insights	Previous research emerges from different paradigmatic positions	Ontologically, agency theories such as <i>ST</i> bridge paradigms; <i>MTS</i> acknowledges the value of theories from different paradigmatic stances	Bridges paradigmatic positions; encourages investigation of subjective and objective insights
5. Theoretical explanation; not description only	Limited theoretical explanations of the phenomenon; theories positioned from different paradigmatic stances	Agency theory provides a baseline for theorisation; multiple agency theories may foster triangulation	Draws on both empirical data and theory to identify underlying causal tendencies or 'mechanisms'; provides a form of explanation; uses different types of logic (for example, inductive/ deductive/ retroductive)

Chapter 2 introduced a number of methodological considerations for this investigation, such as the need for empirical data and theoretical understanding of the phenomenon of women's participation in the DCI. These concerns included: 1) empirical insights, 2) avoiding essentialism, 3) multi-level analysis, 4) pluralistic paradigmatic insights, 5) theoretical understanding and 6) applied findings.

In response, Chapter 3 identified three frameworks to be employed in the analysis of empirical data. As was noted at the end of chapter 3 these frameworks emerged during the highly iterative research process. In qualitative study, "research design should be reflexive process operating through every stage of a project" (Hammersley and Atkinson, 1995, p. 24).

This chapter revisits the concerns raised in chapter 2 and articulates the specific details of the research design employed in the investigation, including: the use of case study (Section 4.1), the pluralistic data collection methods (Section 4.2), the value of Danermark et al.'s (2002) *Six Stage Model of Explanatory Research* to further guide the data analysis and theorisation process (Section 4.3), the issues of research quality (Section 4.4) and concludes with the concerns for theory building (Section 4.5).

As Section 4.1 details, case study provides a suitable strategy of enquiry for several reasons, including its compatibility with Critical Realist ontology. It is vital to explicate ontological assumptions because, as Morgan and Smircich (1980) noted, much of the debate about research methods is "linked directly to assumptions about ontology, epistemology, and human nature" (p.491). Critical Realism argues strongly for the recognition of the relationship between philosophy and methodology (Dobson, 2001b, 2002): "methodology without ontology is blind" (Archer, 1995, p.28).

Section 4.2 discusses the sampling strategy and the pluralistic data collection, where primary data includes interviews and secondary data includes industry documents. The linkages to methodological concerns raised in chapter are revisited. For example, chapter 2 identified the need for rich empirical data of women's experiences. This chapter recommends the method of semi-structured interviews to capture suitable data from the participants.

Section 4.3 discusses how data analysis is further guided by Danermark et al.'s (2002) *Six Stage Model of Explanatory Research*, an approach underpinned by Critical Realism. The actual analysis techniques include several established qualitative techniques such as pattern interpretation. Chapter 2 identified the need to investigate

influences across multiple levels, and to reveal influences that may be difficult to observe. Thus, this chapter discusses the use of techniques such as hermeneutic analysis to reveal these less readily observable influences.

Section 4.4 considers issues of research quality, such as researcher reflectivity and ethics. As noted earlier, an intended outcome of the research is for a theoretical understanding of the phenomenon of women's participation. Accordingly, the chapter closes with considerations of theory building (See Section 4.5). The chapter notes at several points that although the research process is reported in a linear manner, the actual process is iterative. As Maxwell (2005) notes, often in qualitative research, “the activities of collecting and analysing data, developing and modifying theory, elaborating or refocusing the research questions...are usually all going on more or less simultaneously, each influencing all of the others (p. 2).

4.1 CASE STUDY AS A STRATEGY OF ENQUIRY

There are five strengths of employing case study for the investigation.

1. Case study is highly congruent with Critical Realism.
2. Case study provides a suitable research approach for the research problem.
3. Case study provides an established strategy for managing data.
4. Case study can aim for both description and explanation (in the form of theory development) of the phenomenon.
5. Case study is congruent with the use of existing theory.

1) Case study is a suitable strategy of enquiry for this investigation as it is highly congruent with the underpinning ontological stance of Critical Realism. The case study strategy is adaptable, offering a bridge across paradigms (Luck, Jackson, & Usher, 2006). Case study can be used in paradigmatic approaches including positivist (Yin, 2003), critical (Walsham, 1995b), and interpretive (Eisenhardt, 1989; Stake, 1995) research; it is particularly compatible with Critical Realism (Tsoukas, 1989; Easton, 2001, 2005, 2009; Yeung, 1997; Perry, 1998; Montano & Szmigin, 2004; Anderson & Kragh, 2009). Although Critical Realism is a relatively new approach to ontological issues (Easton, 2009), it offers much in the way of a philosophical perspective. It has been applied across a wide range of fields including geography (Yeung, 1997), organisational studies (Ackroyd & Fleetwood, 2000; Reed, 2001), and sociology (Sayer, 1992). Of the few empirical studies which apply a Critical Realist approach, the majority utilise case study. This includes studies in information and communication technologies (Fox, 2009), South African SMEs (Jeppson, 2005), and industrial marketing (Easton, 2009). In the industrial network field, Easton (2000) suggested that Critical Realism offers a “philosophical defence” for case study (p. 206).

From a Critical Realist perspective, case study can “be used to describe empirical events and by its use of multiple data sources, trace out links over time, digging ever deeper, and following through the actual to the real domains” (Easton, 2000, p. 211). Critical Realism values the “standard features of case study” such as the “emphasis on actor’s accounts, reliance on explicit theorizing and attention to sequencing and dynamics of social processes over time” (Mills et al., 2009, p. 255). It is proposed that case study is a suitable strategy with which to reveal the less visible influences on women’s participation.

However, Critical Realism provides less in the way of explicit methodological guidance (Yeung, 1997; Carlsson, 2006). There are only a few examples of empirical Critical Realist studies, particularly in the ICT domain (Dobson, 2001a, 2002; Mingers, 2003), although researchers such as Volkoff, Strong and Elmes (2007), and Wynn and Williams (2008), have provided recent advances. Because there is “no such thing as a method of Critical Realism” (Danermark et al., 2002, p. 73), researchers are left to work towards identifying a method that can be readily applied for conducting empirical Critical Realist studies (Radulescu & Vessey, 2009). However, as Yeung (1997) suggested, a Bhaskerian Critical Realism is not so much “a philosophy in search of a method” (p. 51); rather, in fact, it leaves the theoretical and methodological work to each substantive domain. Thus, Critical Realism fosters openness to the choice of methodological approach. Rather than having a commitment to any single form, Critical Realism recognises the contribution that research methods from other paradigms can make (Mingers, 1997, 2001), thus providing a starting point for the evaluation of already established methods (Danermark et al., 2002, p. 73). Ideally, the choice of method in any research is dependent on: topics and contexts (Layder, 1993); the purpose of the research (Hammersley & Gomm, 2000); the nature of the object under study; and the “purpose and expectation of the study” (Sayer, 1992, p. 4). Critical Realism, therefore, “endorses or is compatible with a relatively wide range of research methods” (Sayer, 2000).

Qualitative techniques are compatible with case study (Stake, 2000, p. 435). However, Critical Realism makes a distinction between ‘qualitative and quantitative’ methods, with Sayer preferring to describe them as “intensive” or “extensive” (Danermark et al., 2002, p.2). The intensive/concrete involves theoretical and empirical analysis (Sayer, 1992, p. 237), and mainly qualitative methods and analysis, to obtain in-depth knowledge of specific phenomena (Jeppson, 2005). A case study approach offers a research approach compatible with the underpinning ontology of Critical Realism.

2) Case study is a suitable research strategy for the research problem, being particularly useful in newer, less well-developed research areas (Dobson, 2001b) and exploratory research (Yin, 1994). In addition, Montano and Szmigin (2004, p. 363)

suggested that case study and Critical Realism are both suitable for understanding complex social situations. As Chapter 2 identified there is very little empirical or theoretical research into the phenomenon of women's participation in the DCI.

3) Case study provides an established strategy of inquiry⁴⁷ (Yin, 1994; Denzin & Lincoln, 2003). Thus, it can help counter the limited guidance in method proffered by Critical Realism. However, case study itself does not have an established approach to analysis (Miles & Huberman, 1994), and this makes analysis a difficult aspect of the case study approach (Stake, 1995). Consequently, the implication for this investigation is that established analysis approaches compatible with Critical Realism must be employed. As is discussed in Section 4.3, Danermark et al.'s (2002) model of explanation can address the analytical limitations of the case study approach.

4) Case study can aim for both description and explanation as outcomes. Andersen and Gamdorp (1990) contended that there are five 'ideal types' of research including: predictive, action orientated, explorative, descriptive, explanatory (p. 41); the latter three were also identified by Yin (1993) as outcomes of case study. Dobson (2001a) noted that when conducting a case study, "the concept of explanation suggests a realist approach", and description suggests more of an "interpretive approach" (p. 283). Thus, case study can combine empirical, theoretical and ontological insights to deliver descriptive and explanatory outcomes. However, as Neuman (1997) reminds us, the distinctions between these outcomes blur "together in practice", as explanatory research builds "on exploratory and descriptive research" (p. 20). Like case study, a Critical Realist approach encourages both a description of the key entities and an explanation. As Table 16 illustrates this investigation will deliver explorative, descriptive, and explanatory outcomes

Table 16 Case study outcomes resulting from the research conducted in this dissertation

Outcome	Yin's(1993) definition	Evident in dissertation
Exploratory	To explore what is happening; data collection occurs before theories or specific research questions formulated	RQ 1 offers an initially broad research question. Framework 1 provides a broad, guiding analytical framework from literature on which to base further inductive analysis.
Descriptive	To describe what is happening; theory can guide the collection of data.	Framework 2 encourages analysis of empirical data guided by the theoretical scaffold.
Explanatory	To explain why it is happening; looks for cause-and-effect relationships	Framework 3 encourages analysis of empirical data by focuses on abstracting the causal tendencies.

⁴⁷ Denzin and Lincoln use 'inquiry', rather than 'enquiry'. This usage may reflect a difference between English and American spelling.

- 5) Case study is congruent with the use of existing theory. Theory can serve as the ‘design’ for the descriptive case study (Yin, 1993, p. 22), or as a scaffold (Walsham, 1995b, 2006). Eisenhardt (1989) argued that binding emerging theory with existing literature strengthens the theory building from case study research. Hence, there is a resonance between case study and the use of the theoretical scaffold (Framework 2) outlined in detail in Section 3.2.2. Table 17 summarises several additional reasons why case study is relevant to the current study.

Table 17 Relevant characteristics of a case study approach

Characteristics of case study	As relevant to the reported case study	Point
Investigates a contemporary phenomenon within its real-life context (Yin, 1994)	A focus on participants’ experiences is congruent with Critical Realist ‘empirical’ domain of reality	2
Reveals a particular event in a real life context (Eisenhardt, 1989); events include individual lifecycles and organisational processes (Yin, 1994, p. 13)	Focuses on events participants experience; congruent with Critical Realist ‘actual’ domain of reality	1
Encourages multiple interpretations (Walsham, 1995b)	Critical Realism values subjective insights; however, is not limited to them	1
Makes use of multiple sources of evidence (Yin, 1994)	Critical Realism encourages triangulation	1
Use of rival (Yin, 1993) or complementary explanations (Walsham, 1995b); may not even entail any ‘field data’ (Yin, 1994)	Typology of theories (for example, the <i>MTS</i>)	4
Phenomenon is “looked at in depth” (Stake, 1995). ⁴⁸	Congruence with a focus on underpinning mechanisms	1,4
Suited to “new research areas or areas for which existing theory seems inadequate” (Eisenhardt, 1989, pp.548-549)	Need for theoretical understanding of a little- researched phenomenon and context	2

4.1.1 CASE STUDY CONTEXT, BOUNDARY AND UNIT OF ANALYSIS

As Yin (1994) proposed, a case study is “an empirical investigation that investigates a contemporary phenomenon within its real life context” (p.14), and is useful when the “boundaries and context are not clearly evident” (p.13). However, case study design requires the identification of a clear boundary (Yin, 2004, p. 165), particularly when the researcher seeks to understand a specific situation or context (Eisenhardt, 1989). This is so even if the boundaries between phenomenon and context are not readily distinguishable (Yin, 1984, p. 23). Case study boundaries can be identified by sampling parameters (Miles & Huberman, 1994, p. 38) such as settings, participants, time, space (Creswell, 1998, p. 61), or process (Yin, 2003). For example, social organisational settings may be considered as a boundary (Morgan & Smircich, 1980; Orlikowski & Baroudi, 1991).

Specification of the context is important to the Critical Realist (Layder, 1993; Danermark et al., 2002, p. 168) as it facilitates the identification of the characteristics of

⁴⁸ Stake’s comments are in regards to intrinsic case study.

the entities involved in the phenomenon under study. In the broader literature, there are a number of contending definitions of ‘context’ (Dervin, 1997). In studies of women’s participation or under-representation in the ICT field, Trauth et al. (2005) proposed that ‘context’ can include geographic characteristics such as state, provincial or regional, or national characteristics.

A case study approach is suitable for an investigation focusing on a specific context, such as the DCI. However, the phenomenon of women’s participation extends beyond the organisation or (even) industry context and wider society; thus, the boundaries of the phenomenon of participation are not readily identified. As Table 18 summarises, the context of the case study includes the organisational context, geographical, and temporal context.

Geographically, the sample population are participants working in Brisbane, the capital of the state of Queensland in Australia. Brisbane may constitute what Pratt (2000) identified as a ‘new media hub’, as the Queensland DCI employs more people in games production than any other state (ABS, 2008a)⁴⁹ Brisbane is also well represented with multimedia production organisations. Thus, a city such as Brisbane reflects the various dimensions of the Australian DCI (organisation size, type, and roles) within a relatively contained geographic location. Because Brisbane provides a diverse range of DCI organisations, it is seen as suitable location context for an exploratory case study; this diversity may reveal different aspects of the phenomenon under study.

Table 18 Context of the case study

Context	As implemented in this case study
Geographical	Brisbane (the capital city of Queensland, a state in Australia)
Temporal	2007-2011 (data collection period)
Setting	Both games and multimedia production organisations
Organisation type	Start-up, multinational, public, private in the Australian DCI
Participants	
Informants	Women employed in the DCI in Interactive Content Creator roles
	Industry stakeholders

Case study also requires the identification of the unit of analysis (Yin, 1994). For this investigation, the unit of analysis for the case study is ‘interaction’; this is reflected in the inclusion of the Interaction (I) category in Framework 1, and the acknowledgement of interaction as a central concern for agency theory (Framework 2) and Critical Realism (Framework 3). As Figure 7 implies, any exploration of interaction must consider the Person (P), and their Environment (E), as constitutive entities of Interaction (I). However, as noted earlier in Chapter 2 and 3, the Critical Realist perspective encourages

⁴⁹ Queensland was followed by Victoria and the Australian Capital Territory.

multiple levels of analysis. The exploratory nature of this investigation entails a certain openness to the data analysis.

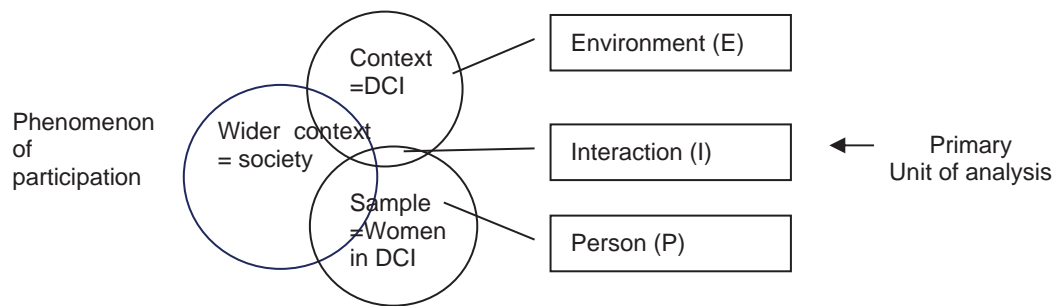


Figure 7: Illustration of the context and 'unit of analysis' of the reported case study

4.2 DATA COLLECTION

This section discusses the study's pluralistic and flexible approach to data collection, which involves questionnaire, semi-structured interview and a wide range of secondary data. Even though the study systematically used established tools and processes such as a question bank, there remained an inductive approach to understanding the data.

4.2.1 PARTICIPANT SAMPLING

Flyvbjerg (2006) noted that there are specific strategies for the selection of participants when using the case study approach. In qualitative enquiry, these sampling strategies include: variation, snowball (or chain), stratified, purposeful, and convenient strategies. Sampling for variation is congruent with Critical Realism, as increasing the range of data collected can increase the multiple realities that are uncovered (Mills et al., 2009, p. 602). Sampling for variation is also a suitable approach for an exploratory case study because any patterns that emerge may be of particular interest (Patton, 1990, p. 172).

In the conduct of this research, the case study employed several sampling strategies including maximum variation, purposeful, and opportunistic strategies (as summarised in Table 19). The purposive sampling strategy limits participants (or informants) to women employed in the occupational role of 'Interactive Content Creation' class 267 (ABS, 2008b). A maximum variation sampling strategy captured a diversity of occupational roles within the interactive Content Creator category and across a range of organisation types and size (that is: start-up, multinational, private/commercial and public/government). Similarly, stakeholders (such as both male and female employers, employees, and industry representatives) are sampled to provide different insights.

Table 19 Examples of sampling strategies in the reported case study

Strategy	Reason adopted	As implemented in the reported case study
Purposive	Informant with required qualities	Female interactive content creators working in the Australian DCI
Maximum variation	Greater range of insights suitable for an exploratory study	Informants employed in a range of roles (for example, design and programming) and organisations (for example, start-up and multinational)
Opportunistic	Unplanned opportunities for data collection	Researcher responds to emerging data sources ⁵⁰
Snowball	Identification of participants who are rich data sources	Participants or industry contacts recommend informants

Further variation can be found in roles that are ‘embedded’, as opposed to ‘core’, and in roles that are ‘public’ as opposed to ‘private’. In ‘core’ production, the creation of digital content is the core business of the organisation. ‘Embedded’ production is the development of digital content to support the organisation’s primary business, “for example, web pages or advertising material for a law firm” (DCITA, 2005, p.6). Although women may be employed in either type of role, it is assumed that core roles are strongly linked with the DCI (in contrast to other industries) and should form the focus of this research.

The research employed a suitable sample size for the method and strategy employed. The aim was not for statistical representation, but rather for suitable data analysis. Onwuegbuzie and Leech (2005a,b, 2007) provided several rationales for systematically selecting sample size in qualitative research studies, the number depending on the design approach. However, the actual number of people chosen to be interviewed requires a “flexible response” (Layder, 1998, p. 70). For qualitative studies, Morse (1994) recommended at least six (p.225) and Bertaux (1981) suggested fifteen as the smallest acceptable sample (p.35). Creswell (1998) recommended 20-30 people for a grounded theory design in order to “achieve detail in the theory” (p. 113) and 5-25 for phenomenological designs (p. 64). Green and Thorogood (2009) stated that “the experience of most qualitative researchers is that in interview studies little that is ‘new’ comes out of transcripts after you have interviewed 20 or so people” (p. 120). Similarly, case study method may focus on a small number of people “nested in their context and studied in-depth” (Miles & Huberman, 1994, p. 27). Accordingly, the sample size of twenty-one participants, 18 female DCI workers and 3 stakeholders, is suitable.

Although case study aims for analytical rather than statistical generalisation, the sampled population may be considered from a quasi-statistical approach. Chapter 1 indicated that there was a 10.7% participation rate of women in the Australian games industry in the 2006-2007 financial year. According to the ABS, 695 persons were

employed in games development in Queensland during that period. If it is then assumed that 10.7 % of the 695 persons are female, this would equate to 74 women working in the Queensland games industry. Therefore, it can be supposed that the sample of 9 women from games production equates to over 10 % of the population of women working in the Queensland context.⁵¹ Of course, this is not statistically sound; rather, it is a supposition that aims to provide an indication of the sample as relative to the number of women employed in the industry. A similar logic cannot be applied to the multimedia industry context for the reasons outlined in Chapter 1 regarding the availability of accurate employment figures.

4.2.2 DATA COLLECTION

The research design aimed to collect multiple forms of data, which included: questionnaire responses from several female workers; interviews with female workers and stakeholders in the DCI, public documents and even theory itself. As noted in Chapter 3, Layder's *Adaptive Theory* (1998) suggested that engaging with multiple sources of data or evidence, adds "strength, density and validity of theoretical ideas and concepts that emerge from the data collection and analysis" (Layder, 1998, p. 68). Layder specified three types of data: empirical (emergent or extant) and theoretical. Theoretical data includes "different forms, types and levels of theory" (Layder, 1998, p. 177), where existing theory scaffolds the research. Multiple sources of data are congruent with the strategy of enquiry of case study and the underpinning philosophy of Critical Realism.

In the conduct of the case study, multiple sources of data were collected, including empirical primary data from participants and empirical secondary data from a range of sources, including industry documents and popular media. Following Layder's (1998) definition (as presented in Table 20) the questionnaires and interviews with the female interactive content creators form the empirical 'emergent' data; as does the semi-structured interviews with the stakeholders. Layder (1998) suggested that emergent research data focuses on the immediate findings and information stemming from a research project. The empirical extant research data includes the secondary data, such as the government reports and industry websites. As Chapter 3 introduced, extant theory may also be a source of data (Layder, 1998, p. 72). Aligning to Layder's approach the development and use of Framework 2—the *Human Agency Multi-Theory Scaffold (HAMTS)*—introduces a body of theory, which can be used as theoretical data.

⁵¹ Several women in the multimedia industry could provide certain insights into the games sector, as they knew of someone in the games industry or had considered the career pathway themselves.

Table 20 Types of data in the case study based on Layder's *Adaptive Theory* (1998)

Layder's definition		As implemented in the case study
Empirical	1. Emergent research data	-Online questionnaire and semi-structured interviews of women working in the DCI -Semi-structured stakeholder interviews
	2. Extant research data	-Secondary data sources; for example, documents (See Appendix 17 for full list)
Theoretical	3. Theoretical data; includes pre-existing general/substantive theory	-Theories in the <i>Multi-Theory Scaffold</i> (as outlined in Chapter 2)

Table 21 summarises the data collection, which included interviews with 18 female interactive content creators and 3 stakeholders. Most of the data collection occurred over two distinct periods. In Phase 1, of the 13 female interactive content creators who completed an online questionnaire (See Appendix 8), 12 were subsequently interviewed. In Phase 2, a further six female interactive content creators were interviewed. Phase 2 participants did not complete the questionnaire, primarily because the tool no longer existed. Upon reflection, it may have been useful to continue its use. Furthermore, 3 stakeholders were interviewed in Phase 2. Thus, the 21 interviews formed the primary empirical data. In addition, a range of secondary data (See Table 22 for examples and Appendix 17 for a complete list) offered a way to triangulate the primary data to add further richness to the research findings.

Table 21 Data source and collection method employed in the reported case study

Phase/Year	Data source	Data collection method		
		online questionnaire	semi-structured interview	secondary data
Phase 1 (2007)	Female DCI professionals	13 responses *	12	
Phase 2 (2009)	Female DCI professionals	Not administered	6	
	Industry stakeholders		3	
Ongoing throughout	Secondary sources			
Total		13 questionnaires	21 interviews (See Table 27 for complete list)	over 60 items (See Appendix 17 for complete list)

* One female interactive content creator's interview was not recorded due to equipment failure

1) PRIMARY DATA: ONLINE QUESTIONNAIRE

An online questionnaire appeared to be an appropriate method to collect initial data from the female DCI workers. There were several considerations in the design and administration of the questionnaire employed in this investigation, which included: 1) the purpose of the questionnaire, 2) the choice of questions, and 3) the practicalities of administering the questionnaire.

The questionnaire's two purposes were: to indicate participants' commitment, and to form a tool for the subsequent interview. The primary contact between the researcher and potential participants was email communication. An initial email provided participants with a consent form, an overview of the research, and a link to a questionnaire. Completion of the online questionnaire by a participant indicated their commitment to be interviewed. Participants completed the online questionnaire prior to a subsequent face-to-face interview and participants' responses sensitised the researcher to each participant's experiences. Participants' questionnaire responses were added to the question bank, which could be used in the subsequent interview (See Appendix 9) if required; for example, to prompt the participant. Witzel (2000) recommended that questionnaires be used prior to an interview to sensitise the researcher; however, as Flick (2009) reminded us, such questionnaires are intended to support the interview process rather than confine it. Consequently, the research approach remained inductive and exploratory.

The questionnaire was comprised of both closed and open-ended questions. The closed questions aimed to capture demographic information such as age, organisation, and occupational role. This demographic data indicated to the researcher the suitability of the participants for the study; for example, were they employed in a suitable occupational role and in their early career stage, and thus fitting the target sample. Furthermore, such demographic information assisted in the description of the context; for example, the type of organisation the participant was employed in. The open-ended questions asked participants about their participation experiences in the workplace. These open-ended questions were established as a result of the literature review. (See Appendix 8 for the online questionnaire provided to participants.)

There were several practicalities involved in administering the questionnaire, which included encouraging participant response rates and the storage of confidential data. Because a short questionnaire can encourage participant response (Aaker, Day, & Kumar, 1998) the questionnaire was limited to 7 questions, in addition to questions about typical demographic data; for example: name and level of education. As ease of access can also encourage response, participants were emailed a link to the online questionnaire. This use of email and online technology was seen as suitable because participants worked in an occupation where technology skills were central. There were several protocols employed for the storage and confidentiality of data, such as de-identification of all correspondence (See Appendix 7 for these protocols).

2) PRIMARY DATA: SEMI-STRUCTURED INTERVIEWS

In the conduct of the case study, the primary data collection method was semi-structured interview of female DCI workers and stakeholders. Interview is a data collection technique often used in case studies (Yin, 1994, p. 84), in qualitative research (Creswell, 1998) and in previous research of female participation in IT (Barker & Aspray, 2006). Furthermore, interview is particularly congruent with research underpinned by a Critical Realist ontology. Interviews provide insight into informants' words and views (Miles & Huberman, 1994; Patton, 1990) and, hence, can capture the individual subject's insights valued by Critical Realism. As interviews can elicit participants' interpretations of their actions and the events they experience (Walsham, 1995b), they can also provide insight into Bhaskar's (1989) actual and real domains. Critical Realism requires that explanations be based on participants' accounts of their concrete experiences.

In the conduct of this study, phase 1 provided 13 questionnaires and 12 subsequent interviews with female DCI workers. Phase 2 provide a further 6 interviews with female DCI workers but with no prior questionnaire. These phases and interview details are summarised in Table 21. As will be discussed, detailed question banks were developed for the interviews with participants; however, an open approach was employed with the first question always being 'Tell me about your experiences of participating in the DCI'. Although each interview began in the same way, new questions were often introduced in response to interviewees' comments or when interviewees needed to be prompted. These questions included those from the question bank (See Appendix 9) and those that emerged from the respondents' questionnaire. Appendix 9 provides reflective insights on the questions used in the interview. Stakeholder interviews took a more open-ended approach, with no question banks. Rather each stakeholder was simply asked for their opinion of women's under-representation in the DCI.

In the conduct of this study, semi-structured interviews were employed because their flexibility is required in exploratory research, where the focus is on discovery in an emergent rather than tightly prefigured manner. Semi-structured interviews also allowed for flexibility in the questions asked during interviews. In this way, the researcher could be responsive to emerging insights and lines of enquiry. Interviews can take different forms, including structured or open-ended forms (Fontana & Frey, 1994). Semi-structured interviews (Myers & Newman, 2007) are seen as offering more flexibility than structured interviews, but not as much as open-ended interviews (Silverman, 2009).

Interviews can also have a particular style. For example, Fontana and Frey (1994) recommended fostering an interview style where the interaction feels like "real"

conversation (p. 139), and allows a rapport to be established between the researcher and participants. Accordingly, the researcher employed a personal, friendly interview style. Specific techniques included those recommended by Holstein and Gubrium (1995), such as the use of a supportive, empathetic voice which conveys “friendship”. The researcher found it relatively easy to establish a rapport with participants. This may be because both the participants and the researcher were female, and members of the DCI community. The researcher may have, therefore, been considered to be what Patton (1990) described as a “native”, not an “outside observer” (Trauth, 1997; Walsham, 1995). Furthermore, the researcher encouraged the participants to ‘tell their story’, as this seemed to be a personal approach to collecting the ‘data’. Thus, narrative techniques, such as “framing the interview” and “inviting” the participants’ comments (Chase, 2008, p. 73) were also used during the interviews.⁵² This approach resulted in participants’ sharing rich personal accounts of their participation in the DCI.

Several factors can influence the responses of the interviewee. For example, participants may “try to ‘assist’ the researcher by giving responses they believe he or she wants” (Giddens, 1993, p.21). In gender-related studies, the influence of second order expectations on interview responses has been noted by Giddens (1993). Accordingly, the research approach employed several techniques to mitigate this influence; these included: recognising the motivation of the interviewee, using an unbiased questioning style, and ensuring the clarity of the interview questions. The personal style of interview was tempered with constant researcher reflection to ensure unbiased data was collected.

The 18 female interactive content creators and 3 stakeholders interviewed provided approximately 250 A4 pages of data for analysis. The interview protocol (See Appendix 7) recommended an interview length of approximately 45 minutes; however, in the conduct of the interviews, the actual length was contingent on the availability of the interviewee and ranged from 38 to 120 minutes. The digital recording of both audio and video of all 21 interviews provided an accurate record with which to establish credibility of data. Video adds credibility and richness to the collected data as it allows for analysis of non-verbal communication (Spiers, 2004; Gibbs et al., 2002). During the transcription of the interviews, the researcher could visually establish the emotional state of the interviewee and accordingly include this in the interview transcript. For example, one participant, in recounting a difficult personal situation in the workplace reflected silently for a moment; video captured this moment more accurately than audio could have done. All interviews were transcribed (in Phase 1 by the researcher and in Phase 2 by a transcription service). Transcripts also captured details such as length of interview

⁵² There were several texts that guided the researcher on techniques to draw out a participant’s story. These included: James Spradley’s (1979) *The Ethnographic Interview*, and Gubrium & Holstein’s (Eds.) *Inside Interviewing*.

and quality of audio. They were emailed to participants for verification; this contributed to the credibility of the research and to what Yin (1994) referred to as a ‘chain of evidence’ (See Section 4.4.3 for further discussion).

3) SECONDARY DATA

Collection of secondary data followed an approach typical of qualitative research with data including: documents, direct observation, and physical artefacts, which are also typical of case study (Stake, 1995; Yin, 1994). As noted in Table 22, empirical extant data collected for this case study includes: secondary data sources such as industry reports, brochures from industry conferences, popular media, raw data from previous industry surveys, policy documents, promotional materials, and website blogs. One key piece of secondary data is the international IGDA survey by Gourdin (2005), which provides over 1000 raw or unedited comments from games workers, including those in Australia. Appendix 17 provides a detailed list of secondary data sources collected.⁵³

Media articles, including those appearing in industry journals, form a pertinent source of evidence. Although it is recognised that introducing media articles as data sources raises a legitimate concern regarding ethical academic rigour (because such extant data may not have the validity of empirical data), the use of “popular” literature is acceptable (Layder, 1998, p. 172). For example, several researchers, including Sumner and Niederman (2002), refer to the trade publications *Computerworld* and *Information Week*. This type of evidence can, at least, be considered an evidentiary tool (Popora in Lopez & Potter, 2001, p. 262). As Puth (1996) suggested, “in many cases, existing secondary data may be sufficiently relevant and comprehensive to answer at least a certain part of the overarching research question” (p.86).

The primary purpose for including secondary data is to triangulate the subjective insights of participant interviews. For example, if a participant were to mention maternity leave (an influence identified in previous research), then a suitable secondary data source may be maternity leave policies (within the organisation) and legislation (at the societal level). Secondary data strengthened the researcher’s interpretation of participants’ subjective accounts. Where subjective accounts contrasted with secondary data, these inconsistencies revealed interesting avenues of further analysis. Furthermore, as Chapter 3 introduced, Critical Realism requires researcher objectivity, and secondary data can help refine the researcher’s interpretation of the participants’ accounts. In this way, secondary data is a “resource” (Layder, 1998, p. 165) that can help support emerging

⁵³ The IGDA diversity survey provided over 1000 pieces of raw data from an international survey of games development workers.

lines of enquiry, add richness to participant accounts, and add depth to findings and emerging theoretical conceptualisations (Layder, 1998, p. 71).

4) THEORETICAL DATA

Layder (1989) suggested that all data, including existing theory, is equally important for theory development. Thus, the Human Agency theories in the *Human Agency Multi Theory Scaffold (HAMTS)* (detailed in Chapter 3) provide a form of data. However, even though the existing Human Agency theories (as specified in the *HAMTS* in Table 11) feature significantly in this investigation, the empirical data (e.g. questionnaire and interview) remains central for two reasons. First, there is a call for empirical data in existing research, particularly “for qualitative research that explores women’s actual experiences” (Adam et al., 2002). Second, collecting subjective insights (from the individuals involved in the phenomenon under study) is central to the underpinning Critical Realism ontology because it is only possible to understand social phenomena by recording and analysing the associated events that take place as a result of individuals “acting” (Easton, 2009, p. 6). Accordingly, participants’ accounts form the bulk of the data collected for this case study.

Table 22 Examples of secondary sources of data and reasons for their inclusion (Full list in Appendix 17)

Category	Evidence	Data type	Description	Purpose for inclusion
Government documents	ABS statistics	Documents (archival)	ABS Survey of Work in Selected Culture and Leisure Activities	Provides objective data such as actual participation rates (2001, 2004, 2007)
	Legislative	Documents	Workplace Relations Amendment (Transition to Forward with Fairness Act 2008); includes the ten National Employment Standards (NES)	Indicates legislative measures towards parental leave; also highlights changing nature of influences (such as legislation introduced in 2010)
	Policy	Documents	House Standing Committee on Employment and Workplace Relations: inquiry into pay equity and associated issues related to increasing female participation in the workforce (2006)	Suggests 'influence' is recognised at a macro level (Participant M2 mentioned male/female pay discrepancy)
Industry research	Survey	Documents	Game Developer Demographics: An Exploration of Workforce Diversity; reported comments (IGDA, 2005a)	Provides 1000+ unedited comments from the survey; comments are identified for gender, age, disability, and sexual orientation
	Interviews	Documents	Queensland Creative Industry Mapping Study (Higgs & Cunningham, 2008)	Includes qualitative data from 20 face to face interviews of industry professionals employed in Queensland, Australia
Traditional media	Newspaper (print/online)	Documents	Sydney Morning Herald blog; comments responding to media article (Appendix 17, Item 16)	Provides insight into how phenomenon is reported to the general public
	Promotional material	Documents	Flyers promoting the benefits of working at a particular games organisation (Appendix 17, Item 51)	Provide an example of organisational culture; describes working at the company as involving 'eating pizza and playing games'
Public websites	Industry websites	Documents	AIMIA (Australian Interactive Media Industry Association)	Shows typical sites participants can access; sites potential participants might be first directed to
	Recruitment	Documents	Recruitment advertisements (Appendix 17, Item 21)	Report a need for employee passion; identify types of occupational roles
	Industry events	Documents	Websites promoting E3 features, Booth Babes (Appendix 17, Item 7)	Indicate the types of cultural content relevant to 'gaming and girls' when using general search terms on the internet
	Initiatives	Artefact	IT Screen Goddess official website and blog (Appendix 17, Item 16)	Exemplifies initiatives responding to phenomenon. Artefact presents women in what may be interpreted as sexualised/glamorous poses.
	Book	Artefact	Tech girls are chic: not just geek (Appendix 17, Item 50)	Exemplifies strategies developed to encourage young girls to consider technology-related careers.
	Digital products	Artefacts	Computer games	Example of male-orientated content in games (e.g. <i>Grand Theft Auto</i>)

4.3 DATA ANALYSIS

As Chapter 3 proposed, employing three different frameworks for the analysis of empirical data—1) analytical, 2) theoretical, and 3) ontological—can help foster an understanding of the influences on women’s participation in the DCI.

Framework 1, the analytical framework, emerged from the review of substantive literature. It fosters analysis of three categories of influences: 1) Person, 2) Environment, and 3) the Interaction between the two. Framework 2, the theoretical framework, fosters analysis of the empirical data through the matching of concepts from the agency theories in the *HAMTS* (See Section 3.2.4). Framework 3, the ontological framework, stems from Critical Realism and entails analysis of a stratified reality comprising of three domains of reality: 1) empirical, 2) actual, and 3) real. Critical Realism also provides the ontology underpinning the research approach.

Although Critical Realism offers much in the way of an ontological perspective, it presents challenges in the actual implementation. Danermark et al.’s (2002) *Six Stage Model of Explanation* provides a procedural approach that encompasses different forms of logic in a manner congruent with a Critical Realist philosophy. Several different forms of logic, or “complementary” modes of inference (Danermark et al., 2002, p. 11) are used to ensure overall understanding of the phenomenon. Forms of logic include, inductive and deductive (Dubois & Gadde, 2002), and abductive and retroductive (Danermark et al., 2002).

In addition, the data analysis utilises established qualitative data analysis techniques. Although Danermark et al. (2002) provided an approach consistent with multi-strategic data analysis (pp. 151-154), there is less guidance offered regarding specific techniques. Consequently, it is proposed that established qualitative data analysis techniques can support the analysis process. These methods include narrative, hermeneutic, thematic and pattern analysis. These different “modes” of analysis (Myers, 1997) and specific techniques or methods of analysis assist in investigating different aspects of empirical data. Indeed, Mingers, (2001) who proposed multi-methodology for Critical Realist studies, suggested that investigating different ‘levels’ of reality requires different research methods (Mingers, 2002, p. 303). Thus, the following section introduces each one of the six stages of Danermark et al.’s model and explains how different modes and techniques of analysis, such as hermeneutics, can be used in an integrated and iterative manner within the stages. Section 4.3.1 describes how Danermark et al.’s (2002) model helps guide the data analysis and theorisation process. Section 4.3.2 provides examples of the actual data analysis.

4.3.1 DANERMARK ET AL.'S (2002) SIX STAGE MODEL OF EXPLANATION

Danermark et al.'s (2002) *Six Stage Model of Explanatory Research* provides a guiding approach for the analysis of empirical data, and one that is highly congruent with Critical Realism. The six stages are as follows.

1. Description
2. Analytical resolution
3. Abduction/theoretical redescription
4. Retroduction
5. Comparison between different theories and abstractions
6. Concretization and contextualisation

As Table 23 presents, the first 4 stages of Danermark et al.'s (2002) model loosely align to the three frameworks proposed in Chapter 3. Stages 5 and 6 entail linking emerging theory to empirical data and align with theorisation reported in the discussion chapter. However, as Danermark et al. (2002) emphasise, the model is not a “template to be followed to the letter” (p. 109); the six separate stages can be “intertwined”, not needing to follow each other in a strict chronological order (p. 109).

Table 23 Danermark et al.'s (2002) six stage model broadly aligned to the three frameworks

Stage		Framework	Framework Emphasis	Logic
1	Description	Framework 1: Analytical framework	Identification of E, P, I entities from the empirical data	Inductive
2	Analytical resolution			
3	Abduction/ theoretical re-description	Framework 2: Theoretical framework <i>MTS</i>	Use of existing theory to further understand the empirical evidence	Abductive
4	Retroduction	Framework 3: Ontological framework	Identification of underlying mechanisms from the empirical evidence	Retroductive
5	Comparison between different theories and abstractions	Synthesis of frameworks		
6	Concretization and contextualisation			

1) STAGE 1: DESCRIPTION

Stage 1 of Danermark et al.'s (2002) model entails the researcher utilising an inductive logic to analyse empirically derived data to illuminate participants' experiences, resulting in a description of the phenomenon. Danermark et al. (2002) stipulated that an “important part of this description is the interpretations of the persons involved and their way of describing the current situation” (p. 109). This description of situation is important for Critical Realism as it stipulates the contextual circumstances of causal mechanisms (Yeung, 1997, p. 57). As noted earlier, description is also an important outcome of case study (Yin, 2011), where a descriptive summary of participants' accounts can help in the overall analytical process (Eisenhardt, 1989).

Although Danermark et al. (2002) emphasised description of the phenomenon, they provided less guidance on specific analysis techniques. Consequently, it is proposed that qualitative research techniques are useful when seeking to establish descriptive findings. In qualitative research, description may be thin or thick. Thin description merely reports “facts, independent of intentions or the circumstances that surround an action” (Denzin, 1989b, p. 33). Stemming from ethnographic approaches (Geertz, 1973), thick description requires the researcher to identify “the voices, feelings, actions, and meanings of interacting individuals” (Denzin, 1989b, p. 83) and the “context, actions and evolution of an act” (Denzin, 1989b, p. 33). Both the techniques of hermeneutics and narrative analysis are useful in establishing thick descriptions (in contrast to thin) of the individuals’ accounts. Like narrative analysis, hermeneutics, as a specific mode of analysis (Prasad, 2002), can provide “a window into human experience” (Denzin & Lincoln, 2008) through “interpretation and understanding” (Prasad, 2002).

Qualitative methods such as hermeneutic analysis appear useful for understanding less readily identifiable influences. Bhaskar’s ‘real’ domain seeks to understand underlying mechanisms: to examine “what is going on underneath” (Archer, 1995, p. 102). Hermeneutics may be useful as it encourages uncovering this ‘underneath’ or ‘underlying sense’ (Myers, 1994), albeit from an individual’s perspective. Critical Realism acknowledges that as social phenomena may have an intrinsic meaning when experienced by humans, that there are hermeneutic and interpretive components in the research process (Sayer, 2000, p. 17). However, hermeneutics has been criticised for not being sufficient for a Critical Realist approach (Mills et al., 2009, p. 254) if it simply offers an explanation of a subject’s meaning, and not the underlying causal tendencies. Both Bhaskar (1979) and Giddens (1984) recognised that there are unacknowledged conditions or unintended consequences which exist beyond the agent’s knowledge. Giddens, who recognises the value of hermeneutic analysis (Byrant & Jary, 1997, p.11) for understanding subjective insights, noted that a hermeneutic interpretation of a participant’s meaning is unable to account for the unacknowledged conditions and consequences of human action (Craib, 1992, p. 25). Therefore, there are limitations regarding the usefulness of hermeneutic analysis.

There are distinctions to be made as to which form of hermeneutics is of value. Traditional hermeneutics is often associated with interpreting textual data (Prasad, 2002) to explore the subjective meaning that an individual may have. Contemporary and dialectical hermeneutics consider the individual’s actions and their environment. Contemporary hermeneutics is relevant to the current case study’s focus on organisations as it considers “organizational practices and institutions, economic and social structures, culture and cultural artefacts” (Prasad, 2002). Dialectical hermeneutics is congruent with

the case study's focus on the interaction of the person and environment because it can consider both the subjective meanings of individual actors and the social structures that condition meanings (Darke, Shanks, & Broadbent, 1998).

Both narrative and hermeneutic analysis techniques are useful in fostering descriptive insights of participants' experiences, as both value a participant's subjective insights. However, both face limitations in identifying the less readily visible mechanisms that Critical Realism values. Critical Realism aims to understand not only "what happened but why it happened" (Montano & Szmigin, 2004). Thus, there is a need to employ further analytical techniques.

2) STAGE 2: RESOLUTION

Danermark et al. (2002) suggested that Stage 2 entails the researcher continuing with their description, while recognising its specific components. The researcher must "dissolve the composite and the complex by distinguishing the various components, aspects or dimensions" (Danermark et al., 2002, pp. 109-110). Danermark et al. (2002) proposed that these component, aspects and dimensions emerge from the empirical data. Although it is expected that analysis of empirical data will reveal these components, aspects, and dimensions, it is proposed that Framework 1—the guiding analytical model—provides a starting point. The categories in Framework 1 serve as what Layder (1998) called 'orientating concepts' where, although coding may occur around the categories (p. 113), these categories do not necessarily influence the data collection (p. 111); nor must data fit these categories. The broad categories in Framework 1 simply foster initial synthesis of a large volume of rich and complex qualitative data.

Similarly, qualitative researchers recognise that description may involve "summarizing, synthesising and extracting essential features or characteristics of a situation" (Morse & Richards, 2002, p. 150), where the aim is to avoid 'garden path analysis'⁵⁴ (Richards as pers.comm, in Bazeley, 2009). Even for qualitative research, "description is part of an analytic journey"; however, "it alone may not be sufficient" (Beazley, 2007). Thus, description can involve analytic techniques to identify categories and/or themes (Mills et al., 2009, p. 927); the distinction between a theme and a category is that the former runs throughout the data (Bazeley, 2009), and the latter does not.

This recognition of patterns can involve recontextualisation of emerging empirical data. Recognising patterns can involve specific analytical tasks including: contrasting, comparing, cataloguing, and classifying data (Miles & Huberman, 1994, p. 37). For example, narrative analysis encourages a "process theory explanation", which provides insight into chronologies, time, and connections within the big picture (Miles &

⁵⁴ Richards describes 'garden path analysis' as the reader being taken "along a pleasant pathway that leads nowhere: 'Here are the roses, there are the jonquils, and aren't the daffodils lovely today!'"

Huberman, 1994, p.146). Narrative analysis offers a way of organising experiences of actions and events over time (Chase, 2008, p. 64) by fostering a life story perspective (Morse & Richards, 2002, p. 118). However, from a Critical Realist approach, there are limitations to using narrative analysis. Although Critical Realism values individual insights, there is a need to move towards a synthesis of these insights. Narrative analysis may not achieve group level synthesis as it has a focus on the “uniqueness of each human action and event rather than their common properties” (Chase, 2008, p.65). The challenge lies in understanding both individual accounts and group level analysis of women’s experiences.

Patterns and relationships also emerge in case study from the aggregation of codes or instances in data (Stake, 1995, p. 74). Analytical techniques, such as pattern analysis, can help in the identification of entities at both the individual and group level. This group level synthesis is integral to Critical Realism, which recognises that whilst there are “multiple subjective realities” or “multiple realities” (Lincoln & Guba, 1985), ontologically, there is synthesis towards an objective reality. This offers, as Sayer (2008) suggested, not so much “multiple realities” as “multiple aspects of a single reality” (p. 11). Thus, it is proposed that analysis follow a dialectic and iterative process that involves data disassembling, the examination of patterns and relationships, and its reassembly to explain. Such patterns are identified by examining the data:

1. within each participant’s data set (which includes questionnaire, interview, and secondary sources of data stemming from participants’ accounts)
2. across participants’ data sets
3. against secondary data

Applying Stages 1 and 2 of Danermark et al.’s (2002) model encourages a description of the phenomenon under study. Stage 1 fosters a description of the entities and context (for example, environment and person characteristics involved in interaction). In Stage 2, description can be further refined and focus on events, as the process of conceptual abstraction includes “isolating an essential aspect of a concrete course of events” (p. 43). The approach of using pattern interpretation can assist a researcher to identify “critical, influential, or decisive” events (Miles & Huberman, 1994, p.115). Recognition of these events is integral to the ‘actual’ domain that Critical Realists seek to understand (Bhaskar, 1978, 1989). These events can be interpreted even if, as Mingers (2004) pointed out, participants themselves may not be aware of these events.

Although description of a phenomenon is a valuable research outcome of research, Mingers (2002) reminded us that a Critical Realist is never content just with “description” (p. 302). Description is just the “first step” before hypothesising the structures and mechanisms that shape observable events (Mingers, 2002, p. 303).

Although the researcher may well become sensitised to possible mechanisms whilst conducting Stages 1 and 2, there is no explicit analytical focus on the mechanisms. Accordingly, Stages 3 and 4 move the analytic process beyond description and towards a specific focus on investigating the underlying mechanisms.

3) STAGE 3-ABDUCTION OR THEORETICAL REDESCRIPTION

Danermark et al. (2002) proposed that Stage 3 requires the framing and reframing of the empirical phenomenon within differing theoretical frameworks. In Stage 3, “several different theoretical interpretations can and should be presented, compared and possibly integrated with one another” (Danermark et al., 2002, p. 110). The objective is the identification of a framework that best explains the phenomenon and/or results in new ideas and, through employing the logic of abduction, shows how something might be (Danermark et al., 2002). Danermark et al.’s (2002) conception of abduction differed from Peirce’s (1955) conception; the latter emphasised abduction from empirical data and not from pre-existing theory⁵⁵.

In this investigation, the use of existing theory during data analysis (using Framework 2) is not dissimilar to pattern matching, an analytic strategy recommended for case study by Yin (2004). However, pattern matching utilises a deductive logic (Yin, 2004) to match a predicted theory pattern to empirical data. Danermark et al.’s (2002) Stage 3 requires that an abductive logic be employed. An abductive logic does not require empirical data to fit any pre-existing concepts or theoretical pattern but, rather, should remain open to emergent codes.

A similar argument is made in qualitative research, where Bazeley (2009) suggested that “there is no problem with a priori categories or themes as long as they are recognised and declared as such, and they are actually supported in the data; the analyst can still retain flexibility and be open to the presence of finer nuances or different emphases in the data” (n.p). In this way, the theories used in the abductive stage do not constrain the data analysis; they may indeed, “introduce new ideas” (Danermark et al., 2002, p. 96). Although Danermark et al. (2002) recognised the value of different theories; they do not offer an explicit method for utilising theories or multiple theories. Chapter 3 proposed an approach that employs ‘different types’ of theories (such as meta, critical, middle range and operationalised) to scaffold research, where different types of theories offer different levels of abstraction.

It is proposed that different theories in the *MTS* (used to develop Framework 2) can reveal different mechanisms. In addition, different theories can also describe “the same mechanisms in a different way” (Danermark et al., 2002) and thus allow the

⁵⁵ ‘Abduction’ is a term coined by Peirce. Abduction allows us to “understand something in a new way by observing and interpreting this something in a new conceptual framework” (Danermark et al., 2002, p. 77).

researcher to consider a theory's "validity and explanatory power" (p. 147). Such multiple perspectives are congruent with a Critical Realist "logic of explanatory pluralism" (Reed, 1997, p. 32).

4) STAGE 4: RETRODUCTION

Danermark et al. (2002) proposed that Stage 4 transcends deduction, induction and even abduction (pp. 85-95). Retroduction being an intuitive and creative process, rather than a logical one (Mingers, 2006). If abduction draws on existing theories for new insights, retroduction returns to abstracting mechanisms from the data. The analytical move is from a description of the concrete phenomena towards explanation by asking what produces them or is a condition for them (Bhaskar, 1986, p. 11, Note 26). Danermark et al. (2002) described retroduction as advancing "from one thing (empirical observation of events) and arriving at something different (a conceptualization of transfactual conditions)" (p. 96). Retroduction is an important aspect of a study that adopts a Critical Realist perspective, as it is "a key form of thought operation in theorising and theory generation" (Danermark et al., 2002, p. 149).

Accordingly, Stage 4 may involve further identification or 'abstraction' of the underpinning mechanisms involved in the interaction between the individual and their environment. Mingers (2006) described this as 'hypothesising' the mechanisms. Although mechanisms may not be readily observable, for the Critical Realist, the causal effect implies existence, regardless of observability. Thus, retroduction, which involves counterfactual thinking (Danermark et al., 2002, pp. 80,101), may lead the researcher to ask questions such as: How would this be if not...? Could one imagine C without ...? (Danermark et al., 2002, p. 101). In regards to specific analytic techniques, pattern analysis is useful in synthesising mechanisms (occurring in the real domain) that underpin the experiences (in the empirical domain) and events (in the actual domain). However, as will be discussed in the findings and discussion (Chapters 5 and 6, respectively), the abstraction of mechanisms provides a challenge for the researcher.

5) STAGE 5: THEORIES AND ABSTRACTION

Danermark et al. (2002) proposed that Stage 5 elaborates and estimates the relative explanatory power of the mechanisms and structures identified in the previous stages (p. 110). The emphasis during Stage 3 (abductive) is on the use of theories to illuminate possible underlying mechanisms and, in Stage 4, (retroduction) mechanisms are identified by the researcher interpreting the empirical data. In Stage 5, the analytical process moves further towards explanation by synthesising the previous stages (for example, theory and empirical evidence). This stage also involves a refinement of which specific mechanisms the study considers because, as Sayer (1992) reminded us, "even

when we are interested in wholes we must select and abstract their constituents” (p. 86). Synthesis also further moves the case study towards the specification of an emerging theory. As Section 4.5 further argues, there are considerations to be made in regards to the type of theorisation that emerges from the research findings.

6) STAGE 6: CONCRETIZATION AND CONTEXTUALISATION

Danermark et al. (2002) proposed that Stage 6 involves examining “how different structures and mechanisms manifest themselves in concrete situations” (p. 110). Hence, further analysis takes the ‘mechanisms’ abstracted from the data and theory (in the previous stages) and ties them back to the empirical data. As will be discussed in the findings and discussion chapters (Chapters 5 and 6, respectively), the emphasis is on illuminating how the mechanisms identified during analysis interact and manifest in a concrete situation.

4.3.2 ANALYSIS OF DATA

As noted in the previous section, Danermark et al.’s (2002) model guides the data collection and analysis. Reflecting stage 1 of Danermark et al.’s model, the research process takes an initially open approach to collecting data that would illuminate people’s actual experiences. Even though tools such as questionnaire’s and question banks were developed the approach remained inductive. By stage 3 there is a different logic at play that of abduction, and the data analysis draws more on theory (such as the *HAMTS*). By stage 5 and 6 there is perhaps less coding of data as the focus moves to the development of theoretical linkages, including the identification of elements and relationships.

The software package NVivo was utilised most strongly in the early stages of coding, in most to manage the volume of rich data. Following data collection, and prior to the development of the three framework, the coding followed a process of refining a large number of free nodes to a smaller set of inductively derived tree nodes. In this early stage it became evident that the data analysis could benefit from an analytical framework and ultimately the literature led to the development of the categories ‘E, P and I’ in Framework 1. The large volume of data was then re-analysed using these categories. These three initial categories or nodes were further refined to be the analytical categories presented in Figure 9 and eventually the *Sphere of Influence* model (Figure 23) - the model resulting from the analysis of the data using Framework 1.

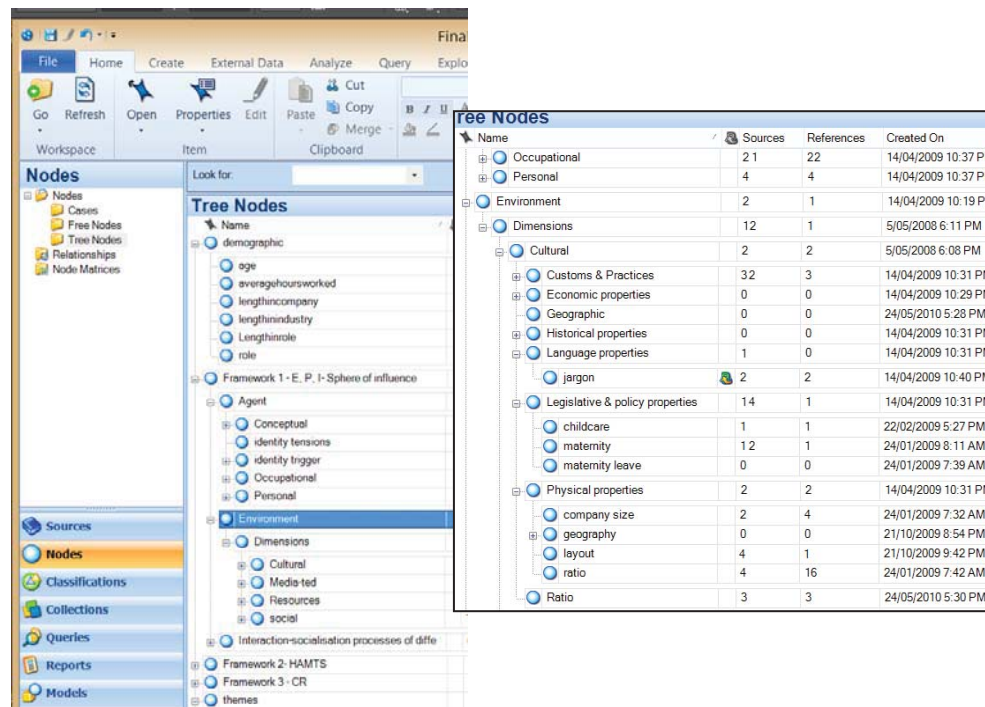


Figure 8 Example of Nvivo project showing tree nodes

During the coding process it became obvious that not all data would ‘fit’ the ‘E,P, I’ model (being Framework 1) and this lead the researcher to consider other analytical categories and to eventually propose further frameworks. For example, participants described the events that were memorable to them, the events that influenced their participation. The researcher created a node titled ‘events’, which sat outside of the early nodes. At a much later stage, when the third framework was introduced the ‘events’ node was moved to sit under that framework. Framework 3 is the critical realist approach, which seeks to identify ‘events’. Similarly, participants often described their confidence and the researcher reflected on the value of introducing self-efficacy theory to further understand the concept and ultimately Framework 2- the *Human Agency Multi Theory Scaffold* was developed. Data was the recoded to the categories that framework 2 provided. This is further discussed in the findings chapter in Section 5.3.

In the conduct of this research, the process of analysis involved employing several methods such as thematic mapping, pattern matching and hermeneutic analysis, in a highly iterative and integrated manner to code the data across the three frameworks proposed in Chapter 3. Table 24 provides a summary of the different coding activities, data sources (Section 4.2.2), and techniques used in data analysis (Section 4.3) as relevant to these three different frameworks (presented in Chapter 3). Although Table 24 aligns the three frameworks to Danermark et al.’s (2002) model, the actual process is highly iterative and does not necessarily have such distinct analytical boundaries.

Table 24 Summary of key analysis activities aligned to the three frameworks used, and to Danermark et al.'s (2002) model of explanation

Framework	Coding activities	Data source	Domains of reality (Bhaskar, 1978, 1989)	Stage of Danermark et al.'s (2002) model	Example of data analysis techniques	Example outcome of analysis ⁵⁶
1. Analytical	Identify key categories in framework	Categories emerge from initial review of literature		2. Resolution		Identify three key categories of environment, person and interaction
	Identify key themes emerging within and between accounts	Interviews, secondary data	Empirical (individuals' experiences)	1 Description	Thematic, pattern	Identify lifespan perspective with which to contextualise interactions
	Code for descriptions of the individual	Interviews, secondary data	Empirical	1 Description	Hermeneutic, Narrative, pattern	Identify tensions between gender and occupational identity
	Code for descriptions of the environment	Interviews, secondary data	Empirical	1 Description	Hermeneutic, narrative, pattern	Conceptual framework of the environment identifies temporal aspects and macro and micro contexts; for example, organisation
	Code for events of interaction	All empirical data recoded to the E, P, I categories	Actual (events and actions)	2. Resolution	Hermeneutic, narrative, pattern	Events such as 'motherhood'
2. Theoretical	Code for the categories identified in the <i>Human Agency MTS</i> , e.g. self-efficacy	All empirical data recoded using concepts in <i>HAMTS</i>		3. Abduction	Pattern	Draws on agency theory for analysis and explanation; helps identify mechanisms, for example, Bandura's mechanism of self-efficacy
	Abstract mechanisms involved in interaction	All empirical data recoded (narrowing focus to mechanisms)	Real (underlying mechanisms)	4. Retrodution	Pattern	Abstraction leads to heuristic models identifying agent-driven mechanisms
3. Ontological	Synthesis (involves reanalysis and reassembly of data)	All empirical data recontextualised to emerging theoretical findings		5 and 6. Theories and abstraction, concretization		Emerging conceptual/theoretical concepts illustrated by empirical examples

⁵⁶ (written post analysis)

4.4 QUALITY

The quality of the research findings can be, to some extent, established by communicating the methods. Accordingly, this dissertation clearly articulates all aspects of the research process. In addition, specific criteria are considered for qualitative research in general (See Section 4.4.2) and for case study in particular (See Section 4.4.3), and the research is underpinned by a Critical Realist approach (See Section 4.4.1). Addressing quality aspects helps establish a systematic and defensible research approach and strengthens the resultant findings.

4.4.1 CRITICAL REALIST CRITERIA

Even though no specific criteria for quality has been developed for Critical Realist research (Healy & Perry, 2000), four measures of quality are considered central: 1) objectivity, 2) triangulation, 3) explanation, and 4) researcher reflectivity.

1) OBJECTIVITY

Sayer (2000) believed that objectivity is imperative for Critical Realist research, where this objectivity includes: 1) epistemological objectivity, 2) objectivity of the researcher, and 3) recognition of the value-ladenness of objectivity (p.58). Epistemological objectivity entails the researcher acknowledging given, real worlds and the subjects' beliefs about them, and in so doing, not committing the 'epistemic fallacy' (Bhaskar, 1978; Sayer, 2000; Archer, 1995) of conflating ontology and epistemology. Conflation occurs when 'what we *think* is' (epistemology) is confused with 'what *is*' (ontology). Archer (1995) recommended that 'analytical dualism' assist the researcher in analytically separating elements⁵⁷. Although analytical dualism involves a form of bracketing, it differs to Giddens' 'methodological bracketing' (Danermark et al., 2002, p. 169). Researcher objectivity entails the researcher reflexively recognising the value ladenness of research.

Several techniques were employed in the conduct of the case study to achieve researcher objectivity, such as memoing. Memoing the research process offered the researcher an opportunity to reflect on the findings and to ascertain if these findings were biased in any way by personal beliefs. A further form of objectivity was achieved by initially investigating entities such as the environment and person in a bracketed manner; this aligned with the analytical dualism required by Critical Realism.

⁵⁷ Archer's (1995) own work separates structure (in particular, culture) and agency.

2) TRIANGULATION

As Yeung (1997) noted, Critical Realism places an emphasis on triangulation to strengthen the quality of findings. Ontologically, Critical Realism proposes that there is a reality we may know; however, epistemologically, our knowledge claims of it are fallible (Lopez & Potter, 2001), but not equally so (Yeung, 1997; Danermark et al., 2002). Therefore, claims about reality must be subjected to the widest possible critical examination to facilitate comprehending reality as fully as possible.

Triangulation can occur with investigators, data, theories, and methodologies (Denzin, 1989; Snow & Anderson, 1991; Stake, 2000; Patton, 1990). Data triangulation is a recommended technique for qualitative research (Denzin, 1989a), case study (Stake, 1995) and Critical Realism (Yeung, 1997). Eisenhardt (1989) commented that, in case study, this type of tactic “exploits the unique insights possible from different types of data collection” (p. 541). Triangulation can develop “in-depth understanding, not validity” (Denzin, 1989a, p.246). Theoretical triangulation asks the researcher to “be aware of the multiple ways in which the phenomena may be interpreted” rather than be “consistent” with theories (Denzin, 1989a, p. 246).

In the conduct of the case study, both data and theory triangulation were employed. As discussed earlier (in Section 4.2.2), data triangulation involved the use of different or multiple sources of data/information, including participant accounts (questionnaire and interview), stakeholder (interviews) and secondary data sources (documents/artefacts). Theory triangulation involves using the four different agency theories in the *HAMTS* for the interpretation of the phenomenon (detailed in Section 3.2.2). Layder (1998) suggested that a multi-strategy approach, which incorporates both theory and empirical data, “automatically contributes to triangulation” (p. 68).

3) REFLECTIVITY

Critical Realism does not deal with measurable or even observable cause and effect relations, but rather with interpreting underlying causal tendencies (Bhaskar 1978; Tsoukas 1989). Thus, data interpretation may be particularly open to researcher bias or to “the subjective nature of knowledge” (Dobson, 1999, p. 268). Similarly, qualitative researchers recognise that “value-free interpretive research is impossible” (Denzin, 1989a, p. 23); thus, there is a need for “explicitness about inevitable biases that exist” (Miles & Huberman, 1994). Critical Realism requires awareness and transcendence of biased beliefs and a “continual commitment to caution, scepticism, and reflexivity” (Dobson et al., 2007), where these increased levels of researcher reflexivity can minimise bias. Similarly, case study encourages researcher reflexivity (Mills et al., 2009).

Accordingly, this investigation employed techniques to minimise researcher bias. These techniques included adopting tenets of hermeneutic analysis (See Appendix 10 for those recommended by Klein and Myers, 1999) which require the researcher to be “deeply self-reflexive and self-critical” (Prasad, 2002). Further techniques involved articulating the researcher’s position (Myer, 1994); this was done by introducing the researcher’s background in Chapter 1. In addition, techniques such as Van Manen’s (1990) “bias bracketing” were useful; these involved the researcher acknowledging and putting aside her personal beliefs, particularly when confronted with statements during interviews that challenged these beliefs. Bracketing involves “suspending one’s various beliefs” (van Manen, 1990, p. 175) and making explicit our prior ideas, biases, or preferences and constant reflection during the research process regarding how to minimise these possible biases. This differs to Archer’s analytical dualism or Giddens’ methodological bracketing, which are of a more ontological nature. At the same time, personal involvement was not totally negated, particularly as it serves to fuel the researcher’s commitment (as noted by Schon, 1983).⁵⁸

In addition, the process of analysis drew on several methods to represent data because, as Miles and Huberman (1994) suggested, representations can help “make sense” of data (p. 91). As Appendix 14 indicates, data representation in this investigation included the use of matrices to organise the data. A high level of reflectivity can be both maintained and evident in self-reflective accounts in tools such as a researcher’s diary (See Appendix 13: Example of researcher reflection).

4) EXPLANATION

When using a case study approach, an explanation of a phenomenon may involve analytic generalisation (Yin, 1984; 1994) as a “penultimate criterion” of theory building (Healy & Perry, 2000). However, the limitations of such generalisability have been noted for case study (Tsoukas, 1989; Flyvbjerg, 2006; Easton, 2003). Indeed, there has been a “general scepticism about the possibility of explanation” from case study, particularly when the case study focuses on description rather than explanation (Craib, 1992, p. 26). Critical Realism holds similar concerns regarding generalisability. While analytical generalisation from case study is compatible with the Critical Realist focus on causality (Easton, 2000), this “generalizing may, however, mean different things” (Danermark et al., 2002, p. 73). Some Critical Realists, such as Sayer (1992), argued that explanations from generalisation are only acceptable in the absence of knowledge of causal powers. Others argue that any explanation involving generalising claims must recognise causal mechanisms (Danermark et al., 2002, p. 1).

⁵⁸ Schon refers to this as the ‘artistry of practice’

In this investigation, generalisability is not a research goal because, as noted, it is not congruent with a Critical Realist ontology. However, generalisability can improve the overall contribution of the case study findings. Accordingly, the findings from the case study can achieve several forms of generalisation (as summarised in Table 25). This includes providing rich descriptive insights, linkages between the empirical data and theory (for example, by using Framework 2), and linkages between empirical data and existing research (for example, Framework 1). Generalisability can also be achieved with the resulting findings being applied to other research contexts (See the discussion in Section 6.2.4).

Table 25 Generalisability of case study findings

Author	Types of case study generalisability	Achieved in the current case study
Walsham (1995a)	Four types: development of concepts, theoretical frameworks, specific implications about the topic of interest and generation of rich insights ⁵⁹	Concepts are presented (for example, E and P in the guiding analytical framework); rich description is an outcome
Lee & Baskerville (2003)	Four types: empirical to empirical; empirical to theoretical, theoretical to empirical, and theoretical to theoretical	A theoretical scaffold facilitates generalisations between empirical and theoretical data
Stake (1995); Creswell (1998)	Naturalistic generalization rather than the generalisation of the findings to other settings (Miles & Huberman, 1994).	May be achieved by research providing a narrative account, a story, a logical presentation
Yin (1994; 2004)	Theoretical propositions, where to 'explain' a phenomenon is "to stipulate a presumed set of causal links about it"(Yin, 2004)	No fixed propositions are used; however, theory can be used to explain aspects of data
Tsoukas (1989)	Analytical rather than statistical generalisability ⁶⁰	The use of theory aids analytical generalisability
Maxwell (1992)	Theory extendable to other situations	Resultant conceptual frameworks used in other research contexts

4.4.2 QUALITATIVE CRITERIA

TRUSTWORTHINESS

As the case study in this investigation utilises research techniques commonly associated with qualitative studies, such as thematic and pattern analysis, certain aspects of Guba's Model of Trustworthiness (1981) can be used for judging the quality or "trustworthiness" (Lincoln & Guba, 1985) of findings. Guba and Lincoln (1989) proposed four criteria: 1) credibility, which corresponds roughly with the positivist concept of internal validity; 2) dependability, which relates more to reliability; 3) transferability, which is a form of external validity; and 4) confirmability, which is

⁵⁹ The dissertation discusses elsewhere that the critical realists underpinnings may involve interpretive approaches.

⁶⁰ Yin (1993) pointed out that even Giddens failed to distinguish between analytical and statistical generalizability in suggesting that case methodology may be "microscopic" because it "lacked a sufficient number" of cases and, consequently, judgments of "typicality" (Giddens, 1984, p. 328).

largely an issue of presentation (Lincoln & Guba, 1985). Table 58 (See Appendix 6) summarises the manner in which the research design endeavours to maintain the four quality criteria and specific validation techniques employed in this study. In acknowledgment of the pluralistic paradigmatic nature of Critical Realism, the equivalent measures for positivist research are included in brackets in the left hand column.

4.4.3 CASE STUDY CRITERIA

In addition to the Critical Realist quality concerns (Section 4.4.1) and the ‘trustworthiness’ of qualitative research (Section 4.4.2), there are certain quality considerations for case study itself.

CHAIN OF EVIDENCE

Maintaining a suitable data management approach is an important aspect of achieving overall quality in case study research (Yin, 1994). Data management illuminates how the researcher has progressed from data to findings, thus establishing a “chain of evidence” (Yin, 1994).

In this investigation, a case study database (in the form of a Nvivo 9 project) contributes to the overall quality by providing a way to maintain the audit trail. The database includes the online questionnaire responses, original video footage, verbatim and annotated interview transcripts, and researcher reflexivity in the form of memoing and field notes. The database also includes the actual coding categories which were used for data reduction, as recommended by Conrad and Serlin (2006, p. 418).

PROTOCOLS

A case study “protocol” Yin (1994, p. 64) also contributes to the overall ‘chain of evidence’ (Yin, 1994; Stake, 1995) to improve the case study’s reliability. In addition, an interview protocol ensures that the main analytical concerns are addressed in the interviews (Patton, 1990; Creswell, 1998). In this investigation, the case study protocol includes: a schedule; an overview of the project; field procedures (for example, credentials and access to sites); guidelines for the management of data and confidentiality; and digital encoding requirements (See Appendix 7). The interview protocols for the current study contain: the main questions, probe questions, location requirements, length of interview, guidance on self-disclosure, and guidelines on the style of interview (See Appendix 8 for the interview protocol used for key informants and stakeholders).

4.4.4 ETHICS

Maintaining quality requires that the study address ethical considerations. For this investigation, ethical considerations included maintaining participant anonymity and

recognising the researcher's axiological orientation; these were in addition to the ethical requirements of the supervising institution. Ethical clearance involved maintaining participant anonymity, particularly as informants may share sensitive personal information. However, anonymity itself is a question of degree, being satisfied either in a weak or strong form (Yow, 1994; Wengraf, 2001). In the weak form, the informant would not be recognisable by the general public (although they may be recognisable by people who know them well). A stronger version is one in which the informant would not recognize himself or herself in the published account (Wengraf, 2001, p.187).

As has been identified earlier, the empirical data collected for the current case study includes people's accounts of experiences. To ensure the anonymity of participants, a weak form of anonymity is adopted. This weak form is achieved by sufficiently changing certain identifying details (name, place, age, occupation, etc.) on all data records (video of interview, questionnaire). All participants and organisations are given unique unidentifiable IDs, which can be used instead of real names in the reporting of findings. Participant IDs begin with a letter indicating the micro context; for example, multimedia (M), or games (G). Each letter is followed by a number to indicate the interview sequence; for example, 'M1' is the first participant interviewed from the multimedia industry. Similarly, organisations in which participants are employed are coded with a letter denoting the ID (as indicated in Table 23), and a stakeholder is coded as 'S'.

Ethical considerations also involve recognising the researcher's axiological concerns, as these may determine aspects of the research, such as choice of problem, choice of the paradigm to guide the problem, choice of theoretical framework" (Denzin & Lincoln, 2008, p.169). In this investigation, axiological concerns are reflected in the inclusion of a critical theory in the *Multi-Theory Scaffold*. Such critical theories sensitise the researcher to issues such as "social justice, equity, nonviolence, peace and universal human rights" (Denzin & Lincoln, 2008, p.13).

Even though the current study is concerned with women's participation, it is not defined as 'feminist research'. This follows Calás and Smircich's (2009) suggestion that the difference between "feminist" and "non-feminist research" lies in the former explicitly focusing on the emancipation and transformation of women, and having gender as the "central axis" (p. 249). However, agency theories themselves do have an emancipatory aspect. Reed (1997) noted that drawing on agency theories from a Critical Realist approach introduces emancipatory aspects by providing "well-informed critiques" of an agent's "restrictive influence and emancipatory potential" (p. 34). Thus, even though Giddens is wary of using the term 'emancipatory' (Bryant & Jary, 1997), and Critical Realism has been critiqued for a lack of focus on emancipatory concerns

(Denzin & Lincoln, 2008) or for not being 'critical' enough (Hammersley, 2009), it does have emancipatory concerns (Easton, 2009). Such ethical considerations or 'tensions' (Walsham, 2006) must be considered as they can influence research outcomes.

There are also the more personal ethical decisions that a researcher faces when interacting with participants. As Denzin (1989c) reminded us "... we must remember that our primary obligation is always to the people we study, not to our project or to a larger discipline" (p.83). There are further ethical concerns regarding the consequences of the study's findings. The reporting of 'gender' issues is itself a part of gender construction and, hence, research can involve a moral intervention (Giddens, 1976, pp. 8,162). It is important to recognise that through "slippage" (Giddens, 1976, p. 162), research findings may enter the everyday vernacular of people. Thus, the researcher must remain aware of the nature of the material published or distributed by the academic community and the media.

4.5 THEORY GENERATION

Much of the discussion regarding theory to this point of the dissertation has focused on the use of existing theory to scaffold the study, in the form of the *Human Agency Multi-Theory Scaffold*. There is also a need to consider the development of empirically-grounded theory, particularly as both case study and Critical Realism encourage theory development.

A researcher must be aware of the contentious points surrounding theory development. There are differing "views on what constitutes theory" (Gregor, 2002, p. 2), where even the term 'theory' is ambiguous (Hammersley, 1995). Thus, there is a need to give an explicit definition of the researcher's view of theory (Gregor, 2002), and to explicate the methods by which any resultant theory is derived (May et al., 2009). Accordingly, the following three questions regarding the development of theory are considered.

1. What form might an emerging theory take?
2. What type of theoretical explanation may result?
3. How might good theory be developed?

1) The first question asks: What form might an emerging theory take? There are different views on what "theory is or is not" (Sutton & Staw, 1995, p. 371). Theory may comprise of written statement of entities, constructs, relationships or propositions (Sutton & Staw, 1995). Giddens (1988) distinguished between a theory and a scheme, sensitising metaphors, and analytic devices (such as analytical models). Such analytical devices can be used to construct a descriptive scenario of how, why and how events in an empirical situation transpired" (Giddens, 1988, p. 162). As sensitizing analytical schemes, these

models are a good “starting-point” for building testable theory (Giddens & Turner, 1988, p. 165).

In contrast to strong theory, tools such as sensitising schemes and typologies aid theory development and represent the interim struggle (Weick, 1989). Typologies, which “fall partway between description and theory” (Bazeley, 2007, p. 192), help to order data and findings (Lofland & Lofland, 1995). Developing typologies requires the researcher to specify concepts (Whetten, 1989), and help “to generate and stimulate theoretical thinking by encouraging the researcher to make comparisons between phenomena” (Layder, 1998, p. 162) and engage in theoretical elaboration (p. 73). Thus, theory development can involve the development of models and frameworks.

2) The second question asks: What type of theoretical explanation can result from the current study? As Section 4.1 proposed, both case study and a Critical Realist approach can achieve description and explanation as an outcome. However, when answering the ‘W questions’—What, Who, When, Why (Whetten, 1989, pp. 490-492)—a Critical Realist perspective may emphasise the ‘how and why’ (Jeppson, 2005; Layder, 1998, p. 100). Even though the main essence of theory is to provide an explanation of observed phenomena, different types of theory may offer different types of explanation (Gregor, 2006; Llewellyn, 2003). For example, in considering Gregor’s (2006) taxonomy of five types of goals for theory development, the current study could achieve theory that is descriptive (Type 1). Type 1 theory offers a form of explanation by identifying ‘what is’, by describing and categorising entities (p. 6). A stronger explanation may be offered by what Gregor (2006) calls a ‘Type 2 theory’, which aims to explain ‘how and why’. Thus, this dissertation can offer different types of theoretical explanation as an outcome.

3) A third question asks: How might ‘good’ theory be developed? Answering this question entails recognising that there are important links between methodology, type of theories generated, and aspects of the empirical experience that are emphasised (Shoib et al., 2006) and, in particular, between the ontology and the practical theory that can emerge (Archer, 1995). As a methodological approach, case study provides analytic strategies for theory building. Although case study can employ useful strategies for theory development, such as “safe guards” (Yin, 1994, pp. 120-121) and a “road map” (Eisenhardt, 1989), there are, as Eisenhardt (1989) suggested, “no generally accepted set of guidelines for the assessment” of theory building from case study (pp. 547-548).

There are, however, criteria that any emerging theory can address, including providing an organized body of concepts and principles to explain a particular phenomenon (Leedy & Ormrod, 2005), and in a parsimonious manner (Eisenhardt, 1989). From a Critical Realist perspective, theory should specify concepts and the

relationships between them, while remaining “close to observable data” (Danermark et al., 2002, p. 126). That is, theory development moves from the concrete to the abstract (Layder, 1998, pp. 100-101), and then returns to the concrete (Danermark et al., 2002). This investigation aims for empirically informed theoretical understanding of the phenomenon under study.

4.6 CHAPTER SUMMARY

Chapter 2 introduced several methodological considerations emerging from the review of literature relevant to the research problem. Chapter 3 introduced three specific frameworks with which to undertake data analysis. This chapter has further articulated the research approach, as summarised in Table 26.

Section 4.1 illuminated five specific reasons why case study, as a strategy of enquiry, is highly congruent with the research problem at hand. Section 4.3 highlighted that Danermark et al.’s (2002) *Six Stage Model of Explanatory Research* is a useful guiding approach for data analysis along with typical qualitative techniques. The *Multi-Theory Scaffold (MTS)*, first proposed in Chapter 3, is particularly relevant in Stage 3 of Danermark et al.’s (2002) model, which involves drawing on theory using an abductive logic. Section 4.3 also explained how qualitative data analysis techniques are of value when using Danermark et al.’s. model. Section 4.4 outlined several considerations to ensure the quality of the research outcomes. These considerations emphasise that any interpretation requires of the researcher a critical reflexivity to ensure their presuppositions do not affect the gathering of the data and interpretation of findings.

In contrast to the previous chapter’s emphasis on articulating the use of existing theory to support the research process, Section 4.5 presented the considerations for theory development. From a Critical Realist approach, the analytic process of theory development must remain grounded in the empirical data—beginning and ending in the “concrete” data (Sayer, 2000). Thus, any emerging ‘explanation’ presented in the following chapters involves the synthesis of empirical data, theoretical insights and ontology, where the ultimate aim lies in the abstraction of the underlying mechanisms or ‘causes’ of participation. Having outlined the methodological plan, the following chapter reports the findings emerging from the case study.

Table 26 Summary of research design presented in Chapters 3 and 4

Research Design	As applied in the current study
Research questions	
	Due to exploratory nature, start broadly and refine through emergent data, theoretical and philosophical perspectives
Philosophical perspective (paradigm)	
Ontology	Critical Realism; for example, Bhaskar's (1986) three domains of reality (real, actual, and empirical)
Theoretical perspective	
Substantive theory	Draws primarily on a range of relevant literature—including gender, ICT and sociological literature—to build on cumulative knowledge in an interdisciplinary manner
Methodological approach	
Strategy of enquiry	Case study (exploratory, descriptive, and potentially explanatory (outcomes)
Object of enquiry	<ul style="list-style-type: none"> - Individual (P-person) - Environment (E-environment) - Interaction (I) between E and P The primary object of enquiry, or unit of analysis, is interaction
Data collection	Multiple sources of qualitative data including: questionnaire, semi-structured interview, documents and artefacts
Data analysis	<p>Employs three frameworks for analysis of empirical data (as discussed in chapter 3).</p> <ol style="list-style-type: none"> 1. analytical- E, P, I (see section 3.1) 2. theoretical- Human agency theory (HAMTS)(see section 3.2) 3. ontological- critical realism (see section 3.3) <p>Data collection, analysis and theorisation follows Danermark <i>et al.</i>'s (2002) <i>Six Stage Model of Explanatory Research</i> (as discussed in Section 4.3.1)</p> <p>The actual techniques used were in most qualitative (as discussed in Chapter 4) and included a range of established techniques, including hermeneutic, narrative, thematic, pattern analysis.</p> <p>The types of data included empirical and theoretical (as discussed in Section 4.2.2, where theory is used as a scaffold. The <i>MTS (Multi-Theory Scaffold)</i> comprised of Human Agency theories (<i>HAMTS</i>) is used as a guide and extant data.</p>
Research quality	Various strategies, including data and theory triangulation; reflective memoing to minimise researcher bias (see section 4.4)
Theory development	
	<ul style="list-style-type: none"> - Draws on <i>Adaptive Theory</i> (Layder, 1998) to utilise existing theory and empirical data for theory development (as discussed in Section 4.2.2) - Uses analytical schemes or conceptual tools to foster theory development - Moves towards explanation, where explanation from a Critical Realist approach requires the identification of causal mechanisms

"... before you impose your theories on the people you study, find out how these people define the world" (Spradley, 1979, p. 11).

This chapter presents the research findings that help address the research problem: 'Why do women participate in the Australian Digital Content Industry (DCI)?'. Two research questions were posed in Chapter 2 in reference to the research problem. The first asked: What are the influences on women's participation in the DCI? The second asked: How can we understand these influences?

Chapter 3 proposed that three different frameworks could be used for the analysis of empirical data: 1) analytical, 2) theoretical, and 3) ontological. Each framework offers a way to identify and understand the influences on women's participation, primarily by considering the interaction between the environment and the person.

This chapter presents the research findings, and the empirical evidence that addresses the two research questions. Accordingly, this chapter is structured as a report on the application of the three frameworks used to analyse the empirical data. Although the research design has been clearly articulated the overall research process has been highly iterative.

The findings from the application of Framework 1 provide rich descriptive insights of the environmental and personal characteristics and their interactions, which can influence women's participation (See Section 5.2). The influences are categorised in a manner that reflects the analytical model offered by Framework 1: 1) Environment, 2) Person, and 3) Interaction between the two. As noted in Chapter 3 (Section 3.1), the analytical model emerged from the initial review of literature in Chapter 2.

The findings from the application of Framework 2 offer theoretical insights by drawing on the *Human Agency Multi-Theory Scaffold (HAMTS)* (See Section 5.3). Using the concepts from the *HAMTS* draws to attention influences such as role models, social norms and self-efficacy. As noted in Chapter 3 (Section 3.2), the theoretical model emerged from the development of a *Multi-Theory Scaffold (MTS)* comprised of four Human Agency theories.

The findings from the application of Framework 3 offer explanatory insights by identifying underlying mechanisms involved in the interaction of the environment and person (See Section 5.4). As noted in Chapter 3 (Section 3.3), the third framework is based on the ontological stance of Critical Realism.

Each framework reveals different types of influences and provides different approaches to understanding those influences. Many of these influences have been identified in previous research regarding women's participation in the ICT industry or

the DCI. The findings provide rich descriptive insights of the influences; illuminating a deeper of understanding of how and why an influence is at play. The three frameworks reveal a comprehensive and detailed insight into the influences relevant in the DCI context.

The key finding emerges from the synthesis of the insights from the three individual frameworks; however, in-depth discussion of this synthesis is reserved for Chapter 6. As Chapter 6 discusses, the three different frameworks offer a complementary insight into a range of influences. The synthesis of the findings fosters the conceptualisation of agent-driven mechanisms. Agent-driven mechanisms offer an original approach to understanding women's participation in the DCI.

5.1 AN OVERVIEW OF THE CASE STUDY

The following brief case study overview begins the process of identifying the influences on women's participation by describing the context and participants. A description of the context reveals that women are under-represented in both games and multimedia organisations. A description of the participants interviewed reveals demographic information, such as the fact that only two of the 18 women interviewed had children. This description reflects Stage 1 of Danermark et al.'s (2002) six-stage model as it entails a description of the contexts and entities involved in the phenomenon.

An important part of description is also the "interpretations of the persons involved and their way of describing the current situation" (Danermark et al., 2002, p. 109). Accordingly, the following findings provide rich verbatim quotes from the interview transcripts. Several quotes are lengthy in order to capture the richness of participants' accounts and to add to the credibility of the researcher's interpretation.

CASE STUDY CONTEXT

The participants interviewed were all employed, at some stage of their careers, in the Australian DCI and based geographically within the city of Brisbane, Australia. The organisations they were employed in ranged from small family businesses, to large multi-nationals, to government agencies. At the beginning of the interview period (2007), Brisbane was one of the largest hubs for Australian based games development. However, by the end of the interview period (2011), three games organisations had retrenched a majority of staff or closed their Brisbane studios. This may have been a consequence of the two global financial events that occurred over the study period.⁶¹

⁶¹ For example, the Global Financial Crisis (GFC) in 2008.

DESCRIPTION OF THE PARTICIPANTS

Chapter 4 described the data collection methods, which included an online questionnaire and semi-structured interviews. The sampling strategy described in Chapter 4 resulted in interviews with 18 female interactive content creators (See Table 27) and 3 stakeholders (See Table 29).

Table 27 Case study participants (female DCI workers and industry stakeholders)

Participant No.	Participant ID *	Position Title	Gender	Number of pages **
1	M1	Creative Director	Female	9
2	M2	Multimedia Developer	Female	16
3	M3	Software Engineer	Female	9
4	M4	New Media Producer	Female	10.5
5	M5	Web Developer	Female	12
6	M6	Web Developer/Designer	Female	7.5
7	M7	Multimedia Developer	Female	13
8	M8	Online News Editor	Female	12
9	M9	Interactive Product Developer	Female	17
10	M10	Social Media Coordinator	Female	***
11	G1	Production Assistant	Female	13
12	G2	Junior Props Artist	Female	10
13	G3	Artificial Intelligence Programmer	Female	13
14	G4	Project Coordinator	Female	14.5
15	G5	Assistant Producer	Female	22
16	G6	Games Designer	Female	13.5
17	G7	Senior Character Artist	Female	22
18	G8	Web Designer/Project Manager	Female	13
19	S1	Games Audio Freelancer (male)	Male	13
20	S2	Games Lecturer (female)	Female	8
21	S3	Employer and Industry Representative (male)	Male	12
Total				224.5

*Coding scheme outlined in Section 4.4.4; ** Approximate number of pages resulting from the interview, where pages are A4, 12point, single spaced (not including questionnaire responses); ***combined with M9 as both attended the same interview

This empirical data offered a factual description of the participants, including basic demographic information regarding their cultural background, age and number of children. As Table 28 illustrates, a notable point is that only two of the 18 women have children. There are, however, limitations to the demographic data as not all participants provided this information; it was voluntary to do so.

Table 28 Overview of female DCI participants

Age				Industry		Cultural background				Children	
**	20-25	25-30	>30	Multimedia	Games	Australian	European	Canadian	Asian	0	1>
5	2	5	6	9***	9	15*	1	1	1	16	2

* Assumed to be Australian; however, participants were not required to provide this information.

** Several participants did not provide their age. *** One participant worked in a multimedia role within a games company, so identified with both sectors.

Findings indicate that the women employed in the DCI have diverse backgrounds and pathways into the industry. Participants' previous occupations included roles in education and in publishing. A majority of the participants had TAFE⁶² or university undergraduate qualifications, several had a Masters qualification, and one, a PhD degree. Not all qualifications were related to the DCI. For example one had a degree majoring in Russian. The majority of the female interactive content creators interviewed were in their early career; this was defined as having less than 5 years of employment in the DCI industry. For most participants, this was their first or second role in the DCI. Focusing on the early career period provided access to a rich intersection of participants' recollections of their situated or immediate work place, their recent history (for example, entry into the workforce or workplace), and of their future career considerations or intentions to remain in the industry.

DESCRIPTION OF STAKEHOLDERS

As Table 29 illustrates, there were three stakeholders interviewed: 1) a male freelancer, 2) a male employer and industry representative, and 3) a female educator and industry representative. Stakeholders were sampled for maximum variation of the insights they could offer. Stakeholder 1 worked as a freelancer in the games industry; however, he also had qualifications in multimedia development. Stakeholder 2 was a male employer and an Australian multimedia industry representative who had a long involvement in the industry (over a decade). The third, a female university educator and Australian games industry representative, provided insights into education and training aspects. The stakeholders were members of key national DCI organisations including AIMIA (Australian and Interactive Media Industry of Australia), and international organisations including IGDA (International Games Developers Association).

⁶² Technical and Vocational Education qualifications range from level 1-6 (Certificates and Diplomas)

Table 29 Overview of stakeholder participants

	Stakeholder type			Industry sector	
	Freelancer	Employer	Educator	Games	Multimedia
1	1 (male)			x	x
2			1(female)	x	
3		1 (male)			x

DESCRIPTION OF THE ORGANISATIONS

As Section 4.2.1 of Chapter 4 outlined, participants were recruited from both games and multimedia organisations, with the researcher actively seeking an equal number of participants from both. Participants were employed across 11 DCI organisations, 10 of which were geographically located in Brisbane. The one organisation not based in Brisbane was a large international organisation; however, the participant employed at the international organisation had worked at several Brisbane organisations prior to her current position. Games organisations ranged from start-ups who had published independent titles, in contrast to larger multinationals that tended to produce well-proven genres from established publishers. Multimedia organisations ranged from small family run start-ups to larger organisations established for over a decade. Table 30 summarises the organisations in which participants were employed; however, certain information is omitted to maintain participant anonymity. Appendix 7 provides further information on several of the organisations.

Table 30 Case study organisations (including games and multimedia production)

No.	Organisation	Code	Type of organisation
1	Krome >	B	Australian
2	THQ Australia >	H	US parent
3	Creative Assembly >	G	UK parent
4	Pandemic >	F	US parent
5	*	K**	UK large multinational
6	Ice Media >	A	Australian
7	Queensland Transport	D	Australian (State Government)
8	Queensland Museum	E	Australian (State Government)
9	*	C	Australian (family run web)
10	ABC Online News >	I	Australian
11	BCM >	J	Australian

* Name not provided to ensure participant anonymity; ** An international organisation; however, the experiences of the participant included those while working in Brisbane, Australia in DCI roles. *** A fourth provided a questionnaire; however, the interview was not recorded due to a technical problem with equipment

DESCRIPTION OF THE OCCUPATIONAL ROLES

The roles the women were employed in varied, reflecting the exploratory nature of the case study and the maximum variation sampling approach. Roles included: artificial intelligence (AI) programmer, web designer, character artist, software engineer, and social media coordinator (See Table 27 for the complete list). The participants self-identified their roles, in either their questionnaire responses or during interview. These roles fit within the ABS defined occupational class of 'interactive content creator'. However, the participants themselves were often not aware of this occupational classification.

Participants identified that many DCI occupational roles were related. There was a *"blurring of lines between multimedia production and gaming as well and graphic design. They're all sort of interconnected so if you're good at one you could easily land in a job in another field that's related to that"* (S1). There was a difficulty in defining what multimedia roles entailed, which can be attributed to the industry's relative youth or emerging status⁶³: *"I think it's because the industry itself is not mature enough"* (M7); and to the ambiguity surrounding the industry: *"Any person you ask what multimedia is will give you a different response"* (M7). There may be scope for the DCI to convey the occupational classification of 'interactive content creator' as a way of minimising the ambiguity surrounding roles in the DCI.

DESCRIPTION OF WOMEN'S UNDER-REPRESENTATION

Analysis of the empirical data (including interviews and secondary data) revealed that women are under-represented as interactive content creators in the Australian DCI. A male freelancer observed: *"There's definitely not equitable numbers"* (S1). Under-representation is most evident in games production organisations. For example, of the 80 staff employed in a Brisbane studio of an international games development organisation (Organisation H in Table 30), only two were women. In another games organisation (Organisation G), only two of the 50 employees were women. Similarly, there are inequitable numbers in multimedia organisations, although there was an assumption that there were more women entering multimedia organisations. *"There are more and more girls getting involved...there are definitely more males"* (S2).

Secondary sources of data support the finding that women are under-represented. For example, a 2009 online web article reported that, in Brisbane-based games organisation THQ studio, only five of the 100 staff were women (Appendix 17, Item 49). An international survey of games workers reported similarly low rates: "I'm a girl

⁶³ The researcher experienced an interesting insight when interviewing one informant, who seven years earlier had been her student. The researcher and the interviewee both acknowledged that the interviewee's occupational role had not existed 7 years earlier.

working in the games...where I work we have no other females working on games” (Appendix 17, Item 28 -F, 31, White, Uni, UK).

Although women were under-represented, participation rates varied across different contexts. For example, public sector organisations, in contrast to private, were seen as being more equitable: *“It’s one thing I’ve noticed is that it seems to be quite equal of male and female”* (M2). The different characteristics or types of DCI organisation (for example, public and private) warrant further investigation.

Low participation rates also manifested in related educational contexts. One stakeholder (interviewed in 2010) described there being a *“phenomenal amount of women”* (S2) participating in a Brisbane university degree program related to games production. The stakeholder attributed this ‘high’ number to the course content, which was about design *“concepts, arts, visualisation, and design”* (S2), thus suggesting that it was more appealing to females. However, this ‘phenomenal’ amount comprised only 20 female students out of 100: a ratio of 1 to 5. A similar pattern appears internationally, where a respondent to the IGDA Diversity survey noted the low rates of female students:

I am attending university now in game development, out of 65 students, there are only three females. (Appendix 17, Item 28-M, 18, White, Uni, Australia)

Participation numbers varied over time. One participant (M7) described the *“ridiculous”* situation where, although the gender ratio had been equitable in the year she began studying a multimedia degree (2003), a few years later there was only one female out of maybe 30 or 40 in their second or third year of study. Further investigation of the patterns of women’s participation (over time) is warranted.

Participation numbers varied across different occupational roles. Although participants identified that it was more common for women to be employed in design and production roles and less in technical roles such as programming and Quality Assurance (QA-related roles), women appeared to be under-represented in art roles: *“I don’t know one female concept artist. I know like 40 or 50 males”* (G7); and *“Although it’s still a majority of males working in the art roles and definitely design roles as well. There are more girls working on art than in the other teams. And I think there is more girls working in design than in programming”* (G3). Secondary sources of data, such as the IGDA report⁶⁴ (IGDA, 2005a), also indicate that women’s participation varies across different types of occupational roles: “Females in my experience tend to be in the more creative areas of the project, like design, artist. I have not come across any female programmers for some reason” (Appendix 17, Item 28-M, 23, White, Uni, Australia). Other respondents in the IGDA survey state: “From my experience, less than 10 percent of a

⁶⁴ Game Developer Demographics: An exploration of workforce diversity –Comments on Diversity Report

QA team for a development project will be female” (Appendix 17, Item 28-M, 37, White, Uni, USA). Further investigation of women’s occupational segregation in the DC is warranted.

DESCRIPTION OF INFLUENCES

Women in the DCI face a myriad of influences that can challenge or support their participation. For example, the participants recounted their limited access to technology in their childhood. Access to technology appears to be an underpinning resource as it fosters skill development and confidence in using technology. In later years, at school, participants described a lack of information regarding career options in the DCI. The lack of information constrained their career choices as it limited opportunities for informed decision regarding a career in the DCI. However, rather than reporting a litany of influences, the findings draw on the three frameworks proposed in Chapter 3 as a way of identifying and understanding influences.

Framework 1 offers three categories with which to analyse the data: 1) environment 2) person, and 3) interaction between 1 and 2. Findings presented in Section 5.2 reveal that a range of characteristics (within these categories) can influence women’s participation. Framework 2 provides several concepts from the Human Agency theories in the *HAMTS* (as presented in Table 11), such as norms and self-efficacy, with which to analyse the data. These concepts foster further understanding of influences. For example, as Section 5.3 reveals, Bandura’s *SCT* draws attention to the importance of same gender role models in scaffolding skill development. Framework 3 requires that the phenomenon be considered using Bhaskar’s ‘three domains of reality’: 1) empirical, 2) actual, and 3) mechanisms. The emphasis of Framework 3 is on the identification or abstraction of mechanisms that manifest in the ‘real’ domain. As Section 5.4 reveals, there are several mechanisms that influence women’s participation in the DCI.

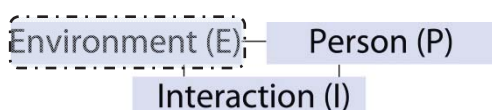
5.2 FRAMEWORK 1: ANALYTICAL (E, P, I)

The analytical framework fosters an investigation into three categories of influences: 1) Environment (E), 2) Person (P), and 3) the Interaction between the two (I). Accordingly, the empirical data collected for the exploratory case study was categorised into these E, P and I categories of Framework 1. The findings extend and refine the three categories of the guiding analytical framework. This refinement reflects Stage 2 of Danermark et al.’s (2002) model, which involves the resolution of various components, aspects, and dimensions.

As Section 5.2.1 (below) presents, the refinement of the Environment (E) category leads to the identification of four dimensions of the environment: 1) social, 2)

cultural, 3) mediated, and 4) resource. Within those dimensions, several properties manifest at either macro or micro levels. The refinement of the Person (P) category in Section 5.2.2 leads to the identification of one dimension of social identity, which in turn is comprised of two major properties, gender and occupation, and two minor properties, age and race. The term ‘dimension’ is chosen to describe these categories; this is because the term ‘category’ may imply a bounded relationship, whereas ‘dimension’ reflects interconnectedness. As Section 5.2.3 presents, the researcher faced a challenge in refining the category of Interaction (I) by solely using inductive reasoning. Drawing on the ontological underpinnings of Critical Realism helped to stimulate further analysis and led to a focus on events, specifically events manifesting from the interaction of the environment and person.

5.2.1 THE ENVIRONMENT (E)



The analysis of empirical data led to the refinement of the Environment (E) category in Framework 1. Influences could be categorised across

four key dimensions, which in turn could be further refined by identifying properties within those dimensions. The environment category is further refined by identifying the temporal context and different levels of the environment, including macro and micro.

FOUR DIMENSIONS OF THE ENVIRONMENT

Chapter 4 discussed the data analysis techniques, which included pattern analysis. Pattern analysis of the empirical data led to the identification of four sub-categories or dimensions within the Environment (E) category of the initial guiding framework: 1) social, 2) cultural, 3) mediated, and 4) resources (as illustrated in Figure 8). Each of these dimensions is introduced below and described in greater detail shortly.

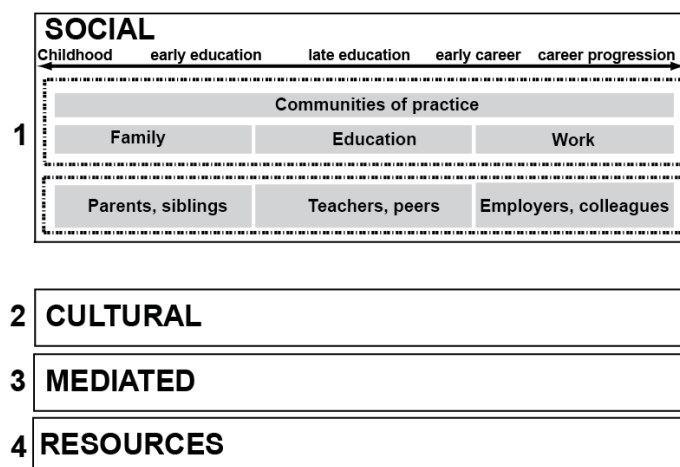


Figure 9: Refined ‘Environment’ (E) category

1) The **social dimension** recognises that an individual may experience different social contexts (including communities of practice, family, education and work), and other people or social agents (such as parent, peers, and colleagues) within those contexts. As will be explained further on, the social dimension recognises a temporal aspect as the contexts can be positioned along a typical lifespan comprising of childhood, early and late education, early career, and career progression.

2) The **cultural dimension** recognises a wide range of societal influences. These are, for the most part, characteristics of the face-to-face environment a person experiences. As will be further outlined, data analysis resulted in the cultural dimension being conceptualised as encompassing: social beliefs and practices; and linguistic, geographic, economic, and political properties.

3) The **mediated dimension** recognises that not all interactions between people are face to face. Rather, they are mediated by other mediums of communication, such as literature, television, mobile phone, and technologies such as the internet.

(4) The **resources dimension** recognises that objects or entities within the environment may influence participation. As will be further described, the analysis of empirical data reveals that the resources dimension includes information (for example, learning resources), artefacts (for example, computer games) and technology (for example, computers).

TEMPORAL ASPECTS OF THE ENVIRONMENT

Participants recounted influences as occurring in their childhood, during schooling, within the current workplace context, and even as future possibilities. The researcher interpreted that participants positioned their participation along five lifespan stages (See Table 31), starting from birth through to adult years. At the childhood lifespan stage (birth to early school), typical environments women encountered were the family home and school. In later life, when women are in the workforce, typical environments are workplaces. As Figure 10 indicates, the focus of the current case study is the industry context, which aligns to the workforce life stage (Stage 4 in Table 31).

Table 31 Lifespan stages and contexts of participation

	Lifespan stages	Typical environment
1	Childhood- birth to early schooling	Family, school
2	Early education-junior to high school	Family, school, hobby and sporting contexts
3	Late education-university or further education	School
4	Workforce entry- early years of career entry	Workplace
5	Workforce progression-career advancement	Workplace

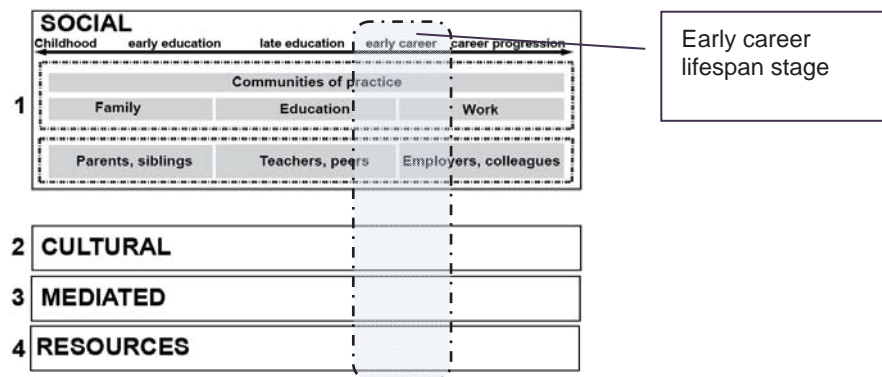


Figure 10: 'Early career' context within the social dimension of the 'Environment' (E) category

Participants' accounts suggested that their early experiences informed later life experiences. For example, childhood exposure to computers at *"an early age"* (G6) had an influence later in life as it fostered their self-efficacy towards technology. Participants noted that it was difficult to maintain their interest in technology during their adolescence (Life Stage 2 in Table 31) if their female friends didn't share the interest.

One participant reminisced how, at the age of 6, she had girlfriends with whom she shared an interest in computers: *"I had good girlfriends who also had Commodore 64's at home so we'd have commodore 64 parties and that was just a part of the group"* (G2). However, she noted this changed in her adolescence: *"Then as I grow older I find I don't have as much in common with girls as much as boys"*. Another identified the skills she developed as a teenager assisted her in her current role in the DCI. She had *"spent a lot of time like as a teenager online reading blogs and chatting [unclear] in forums"*, and this provided her with *"quite a lot of experience"* (M8), and led her to be *"pretty good with computers [omitted] compared to probably the average person"* (M10). Thus, childhood experiences had an effect on participation later in life. Table 32 presents examples of influences categorised to both the four different dimensions of the environment and the lifespan stages.

As discussed in the next chapter, organising the description in a manner that keeps sight of the temporal aspects fosters more holistic findings by identifying the influences that manifest at a certain life stage, and those that also surface across life stages. Thus, temporal aspects must be recognised when seeking to understand influences.

Table 32 Matrix of influences across the four dimensions of the ‘Environment’ (E) category from a life stage perspective

Dimensions		Social		Cultural	Mediated	Resources
		Context	Social agents			
Life stage	Childhood	Family	Parents, family members	Customs and practices	Television	Technology; for example, computer
	Early education	Educational institution	Teachers, peers	Socialisation practices	Magazines	Literature, technology
	Late education		Peers, teachers	Gender ratio		Training material
	Early career	Workplace setting	Colleagues, employers, mentors	Policies	Television	Email, websites
	Career progression	Conference setting	Family, employer, colleagues	Organisation culture		Access to child care
	CoP	Online gaming	Peers		WoW ⁶⁵	Computers

MACRO AND MICRO ASPECTS OF THE ENVIRONMENT

Further pattern analysis reveals that the four dimensions of the Environment (E) may be further refined by identifying characteristics of the macro level environment (for example, global or national setting), and the micro level (for example, organisation setting). Participants did not explicitly identify ‘macro’ or ‘micro’ influences; rather, this categorisation process was achieved by the researcher’s interpretation of the data.

As Figure 11 illustrates, once the Lifespan Stage (A) (for example, early career) has been recognised, the social, cultural, mediating and resource dimensions (B) can be explored at both the micro (C) and macro (D) level. The four dimensions of the environment (B) can be used to explore the macro level characteristics (D). Participants’ comments suggested that, at the macro level, the cultural dimension includes properties such as legal –national EEO legislation, national policy – AWA’s⁶⁶, and economic – dot.com crashes and the GFC (Global Financial Crisis)⁶⁷. The mediated dimension includes mainstream television, radio, the internet and newspapers. The resources dimension includes technological infrastructure; for example, access to affordable and reliable internet or broadband services.

Similarly, the four dimensions of the environment may be used to explore the micro level influences (C). For example, participants’ comments suggested that: at the micro level, the social dimension involves people in the workplace; the cultural dimension involves the characteristics of the organisational culture such as policies; the mediated dimension involves the localised effects of media such as industry newsletters

⁶⁵ *World of Warcraft* (WoW) is a massively multiplayer online role-playing game (MMORPG).

⁶⁶ Australian Workplace Agreements (AWAs) were proposed by the Australian government in the mid-2000s.

⁶⁷ Participants indicated they were aware of ‘legislation’ and this may refer to specific legislation, such as Equal Opportunity Act 1995, and Equal Opportunity for Women in the Workplace Act 1999; however, these were not explicitly mentioned.

and websites; and the resource dimension involves the resources available to the individual within the organisation such as computers. Thus, influences can manifest at both the macro and micro levels of the environment.

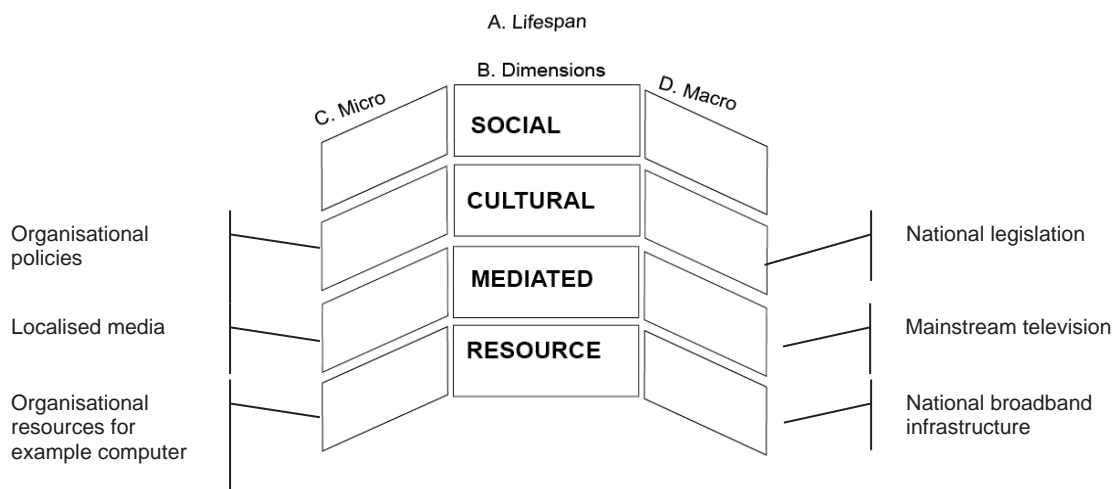


Figure 11: Macro and micro levels across the four dimensions of the Environment (E)

There were links between macro and micro influences. For example, several participants noted that the general economic health of the country (macro level characteristic) could influence local hiring practices (micro level characteristic): *“Games industry itself right now is suffering from the whole economic drama worldwide and we’ve had several large companies just locally be closed down and a whole bunch of people were out of work”* (S1).

Secondary sources suggest outsourcing may further reduce local opportunities (See Appendix 17, Item 38: an advertisement for overseas labour for as little as \$4 an hour). If international games companies outsource to cheaper labour in countries other than Australia, this would ultimately influence an individual’s micro environment by constraining their salary potential and employment opportunities.

Identifying a relationship between macro and micro level influences helps view findings in a relational and unified manner. Table 33 identifies the properties manifesting at either the macro and micro levels across the four dimensions of the environment, and provides examples of the influences within those properties. Findings indicate that although each of the four dimensions manifest across the macro and micro levels, properties may or may not emerge at both. For example, the ‘economic’ property manifested at both macro and micro levels. There was evidence of global economic properties such as the dot.com crash and the Global Financial Crisis (GFC) at the macro level, and local hiring practices at the micro level. However, the language property manifests only at the local (micro) level in the form of jargon (relevant to technology and

software). Further research of properties across both macro and micro levels of the environment is warranted.

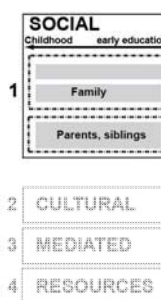
PROPERTIES OF THE ENVIRONMENT

As Table 33 shows the four dimensions of the environment were further refined to identify properties within those dimensions. These properties include: the social agents in the social dimension; the gender ratio and workplace practices in the cultural dimension; the mediums of the internet in the mediated dimension; and resources (such as magazines) in the resources dimension. The identification of properties within each dimension further organised the rich description. The following section provides further descriptive insights of several properties within each of the four dimensions.

Table 33 Examples of influence in the DCI within the environment dimension

Dimensions/Property	Macro level influence	Micro level influence
Social		
Agents		
Family		Father, mother, brother, child
Peers		Male colleagues in the workplace
Role models	Few role models	
Mentors		Often male
Settings		
a) Family		Home
b) Education	Educational institution	Specific student cohort
c) Work	Industry associations, parent company	Social groups in the workplace; for example, sporting groups, industry associations
d) Communities of practice	WOW, conferences	Special Interest Group (SIGs)
Cultural		
Physical		Open plan offices
Ratio	Gender ratio approx. 50%	Gender ratio approx. 11% in games organisations
Language		Technical jargon
Economic	Dot.com (2001), Global Financial Crises (2009), job insecurity	Local redundancy
Customs/practices	Gaming becoming more mainstream and family friendly	Garage versus professional practices: beer and pizza culture, casual clothing
Legislation and Policy	AWA work agreements; Fair Work Act 2010	Unclear organisational policies; no union or occupational awards
Historical	Women's right to work	Few women in the pipeline
Geographic	Australia's geographic isolation	Brisbane a games hub
Mediated		
Medium (television, magazines, internet)	Lack of roles models in TV programs	Presenters at industry conferences predominantly male
Resources		
People		Lack of female mentors
Information	Books, internet	Specific websites, for example, Gamasutra
Technology	Affordability and availability of computers	SDKs, software, file exchange facilities

1) SOCIAL DIMENSION



Recognition of the social dimension fosters a description of the 1) social setting, and 2) of the social agents or people (within the setting). Although the case study investigates women's participation in DCI organisations, participants often described their current participation in relation to their past experiences. For this reason, the conceptualisation of the social dimension recognises a lifespan perspective and identifies various social settings that a person encounters in their life (as identified in Table 31).

Table 34 Micro context related to lifespan stages

	Lifespan stages	Social setting	
1	Childhood-birth to early schooling	Home	Communities of Practice (CoPs); (for example, social groups)
2	Early education-junior to high school	Education	
3	Late education-university or further education		
4	Workforce entry- early years of career entry	Work	
5	Workforce progression-career advancement		

There are four social settings 1) home, 2) education, 3) work and 4) CoP, as presented in Table 35. Participants identified home setting most often when talking about their childhood), education (schooling period) and work (career period). The communities of practice (CoP) may occur at any point of the lifespan and are exemplified by social networking phenomena such as Facebook.^{68,69} Many games companies maintain social media profiles via Facebook (See example in Appendix 17, Item 5). In addition, these settings include the people (social agents) within those social settings. Participants identified social agents as including family, friends, teachers, university professors, and peers, as illustrated in Table 35.

Table 35 Social agents identified within social settings

1) Social Settings		2) Social Agents					
		Family	Friends	Peers/colleagues	Teachers	Employer	Role models/ /Mentors
a) Home		x					
b) Education			x	x	x		x
c) Work			x	x		x	x
d) CoP			x				

X indicates clear evidence (from empirical data) of the agent within the micro context of the social setting

A) HOME

Participants described characteristics of their home setting as influencing their participation. Most made reference to home settings when reflecting on their childhood, although a few noted their adult home settings as well. Key social agents in their childhood were family members including father, siblings and to a lesser extent their

⁶⁸ The definition of a CoP follows Wenger (1998).

⁶⁹ A popular online social networking website site: <http://www.facebook.com>

mothers. Fathers were often mentioned as being the facilitators of access to technology: *"I was quite young, like probably 9 or 10 he would show me like things on the internet. Yeah, so he introduced me to it at a very young age"* (M8). Other participants recounted positive memories of playing computer games with their brothers: *"My brothers were into it...I've played games all my life"* (M10). She recounted how her brother had facilitated her early access to technology: *"My brother did an IT degree and he brought home an XT that he built at uni and very proudly gave it to the family and let us play with it"* (M10). One participant, an Artificial Intelligence (AI) programmer, commented on how supportive both her father and mother had been, consequently minimising the influence of the constraining stereotypes surrounding women's capacity to use technology: *"Well right from when I was very little I never like had a negative stereotype of getting into that kind of thing [computing]. Whereas most women would think oh no, that's not me"* (G3). Another participant suggested that *"if you're involved with that from a very early age you grow up thinking 'oh it's not just a guy thing' it's something that girls can do"* (G5). Thus, family members were seen as an influence on women's participation.

B) EDUCATION

Participants described characteristics of their education setting as influencing their participation. Education settings included TAFE, short courses, and university. Key agents in these settings were teachers and fellow students. As noted earlier, participants would often be in the gendered minority in these education settings: *"All the subjects I have chosen like math's and animation it's predominantly a male orientated environment, like I've probably been 1 of 3 girls in anything I've tried"* (M2). Participants also noted that education settings did not always provide the conditions for developing skills suitable for a DCI career:

The programming we did at high school was completely different it was really outdated on Macintosh computers...nothing to do with any sort of programming at the end of the day and it didn't really give an accurate representation...no one liked the teacher who taught it ...I think most people's only access to it was for a few weeks in Grade 8 in this sort of negative environment. (G3)

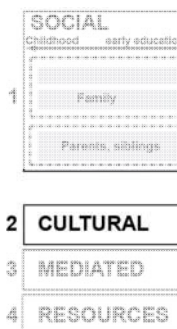
C) WORK

Participants described the characteristics of their work setting that had influenced their participation. Work settings included a range of organisation types such as start-up, multinational, private, and public. Key agents in these contexts were mostly male colleagues, employers, clients, and publishers. As the case study focuses primarily on women's career participation, further characteristics of DCI organisations are detailed shortly.

D) COMMUNITIES OF PRACTICE (CoP)

Participants described the characteristics of several social and professional groups to which they belonged. These groups included social networking groups on Facebook, online gaming groups [such as World of Warcraft (WoW)], sporting groups, and industry-related functions such as conferences. The key characteristic of these groups was that they provided a sense of community to the individual. Thus, this setting is conceptualised as a Community of Practice (CoP). The CoP could run in parallel to the home, education and work settings. The CoP often fostered skill development related to the technology employed in the DCI, such as computer and the internet skills. For example, a participant noted that although her school provided very little in the way of computer resources, she gained experience by participating in online communities, where she learnt basic programming skills. Participant M3 described how, through playing games online, she developed an interest in modding (modifying aspects of the game) and thus extended her technical skills. Key agents in these settings varied greatly, being dependant on the nature of the community, but included fellow gamers and other industry professionals. Further research could consider the relationships between the CoP and other settings.

2) CULTURAL DIMENSION



Cultural characteristics of the environment, specifically the micro context of the DCI organisational context, are an influence on women's participation. DCI organisations may present an uninviting workplace culture to women. A male games freelancer described the influence of the primarily “*really, really male*” culture as a “*bleeding obvious*” (S1). He suggested that women might not find the male-orientated culture that existed within DCI organisations as appealing.

The male freelancer conveyed that he did not personally relate to the ‘male’ culture; however, because he was a male he could more readily position himself within it.

Secondary sources of data indicate a similar situation in the related IT Industry (Appendix 17, Item 47):

I would probably socially know how to handle people like that a little better and know where to place myself to get by and to deal with them and to make it work. But I could see how it would be uncomfortable potentially for women. (S1)

Several participants explicitly mentioned the influence of organisational culture. There were cultural differences between different organisations. For example, the multinational's “*professional*” (M2) and “*corporate culture*” (G4) contrasted with the independents that “*started off as a couple of guys and all that sort of thing*” (G4). Government organisations were contrasted to private organisations as having a “*different*

culture” (M2). DCI organisations also appear to have sub-cultures, formed through shared interests among colleagues:

There's a lot people who love pirates and it seems silly but...people ...share common interests...I think working in a specialised field, you tend to get people who are quite similar and yeh we all seem to get along quite well. So those would be advantages. I think there's a nice culture here. (G4)

Analysis of the empirical data led to the dimension of culture being further refined to identify several specific properties including: a) physical setting, b) ratio, c) language, d) economics, e) customs and practices, f) legislation and policy, and g) historical properties. As the case study is concerned with women's participation in the DCI, the evidence below mostly pertains to the properties that manifest within the micro context of the organisation.

2A) PHYSICAL PROPERTY

Participants referred to the size of the organisation (with reference to the number of employees) as being a possible influence. There was a preference for medium sized organisations:

You're looking at a company that's got 50 people or less to get that quality of workplace conditions which is far more rewarding than working for a larger company. (M5)

Small organisations could create a supportive environment because everyone knew each other: *“Like you know everyone's name and you can have a chat with everyone”* (M1). However, the negative aspect of a small organisation was that employees could feel as though they were micro managed and that they could not avoid certain colleagues: *“There are less people so the interaction is harder, and it's harder to avoid people”* (M1). Organisations needed to be *“small enough”* to *“keep personal touch with people”* (M1). Large organisations were also seen as being linked to poor life/work balance:

Basically you can't have life if you're working in advertising agencies, especially in the big network. So I thought no I don't want to work in that kind of environment I would prefer a little design studio. (M1)

Additionally, participants suggested that the physical layout of their work environment could be an influence. Open plan spaces facilitated greater communication between workers: *“It was open plan so we were working together all the time ...”* (G3). Field observations confirmed that the organisations B, H, and A (See Table 30) had open plan layouts for workers; however, other organisations were not directly observed. Thus, open plan medium-sized organisations can foster women's participation.

2B) RATIO PROPERTY

Findings suggest that it is not only the number of women in an organisation that matters; it may be the ratio of women that influences their participation. For example, one of the largest games companies had the highest number of women employed: of the 280 employees, approximately 28 were women. However, its rapid growth had led to the isolation of the female staff. The environment had become *“so big all the girls had sort of been scattered around”* and they might not *“even pass each other in the corridor”* (G1). The gender ratio influences the sense of belonging women may feel, with lower ratios making women feel as though they were in the *“minority”* (G1). However, as one employer suggested, although the ratios create unbalanced work environments, they were difficult to address. *I think games [presents an] unbalanced work environment... But it's a fact so...to address that balance is pretty difficult for them to do. You're swimming against the tide for the one or two women that do sort of hang out there.* (S3)

In addition to the gender ratios in a workplace, there was a need to consider the ratio of occupational roles. One participant described feeling professionally isolated, not because she was the only female in her workplace, but more so because she was the *“only designer”* (M6). She expressed the need to interact with other designers so that she could develop her skills.

Although women were in the minority in the DCI, participants' accounts suggested they could 'cope' with being in the minority; however, this *“takes a while to get used to”* (G8). As one participant noted, attending a meeting where *“there's 30 guys there and you're the only female”* can be *“a little bit weird”*; however, *“I don't know if that's a barrier or not”*, although it would be *“better if there were some more females”* (G8). Thus, the evidence suggests that although gender and occupational ratios are an influence, they may not be a barrier to women's participation.

2C) LANGUAGE PROPERTY

Language manifested as a property of the environment. The DCI appears to value workers with specialist technical knowledge of software and hardware, and this knowledge often involved technical jargon. Participants identified the need to learn technical jargon as it fostered a sense of confidence and belonging to the work environment. One participant recounted that *“the jargon can be quite intimidating but once you know it, it's really simple to understand”* (G1). Another participant was surprised she picked up the jargon so quickly: *“I picked up you know the jargon really quickly, knew what was going on, knew what I was looking for, it all seemed to come really naturally, I'm like ohh”* (G1). Thus, the evidence

suggests that mastery of language (as a part of culture) is an influence on women's participation.

2D) ECONOMIC PROPERTY

The property of economy influences women's participation. Earlier findings identified that the economic property could manifest at the macro level in the form of global financial conditions. Micro level economic properties included low levels of remuneration for DCI workers. Participants suggested other industries offer higher salaries; thus, transitioning from other industries could involve a pay cut: *"She'd be going from sort of a 80-90 thousand job to entry level position in the company which I'm sure she'd be willing to do but it's very difficult to"* (G2).

Participants suggested workers may leave the DCI because they realise they can be better remunerated in other industries. For example, in *"admin assistant roles you can use your basic multimedia skills to do up the brochures and things like that, so I'm sure they utilise their skills elsewhere and there probably is more money in some of those roles than there is when they start out within the private sector"* (M2). It was suggested that low salaries manifested as a result of people wanting to get an initial start in their careers. There are people who *"will work for nothing"* (G7). Lower salaries may also correlate with the participants being in their early career stage. There was a high level of ambiguity in regards to what remuneration might be expected: *"In this industry salary is a little questionable"* (G8). For example, women in games roles identified that 'games' paid low salaries. In contrast, the women in multimedia saw games roles as being lucrative: *"I would think the gaming industry in particular is quite well paid although you do horrendous hours"* (M2). These were similar findings to the *Insight Economics 2006 Australian Electronic Game Industry Report* (Appendix 17, Item 54) which found that in a survey of games workers, there was considerable variation in salaries for some occupations. Thus, the evidence suggests that there is ambiguity surrounding salaries in the DCI.

There was often a trade off between salary and working conditions. The more a person earns the less likely they would have a life/work balance: *"If you work for EA in Canada you'll definitely make 6 figures if you're good and umm if you work for a smaller company you make a lot less but you get a way better work environment so it's all a trade off but definitely games pays less. I think that perception is within the industry"* (G3). One participant noted that the 2005 EA spouse case (See Appendix 17, Item 34) in the US had fostered *"better conditions"* for the industry: *"So I think every now and then there's a big kick in the pants for*

the industry ... so now there are a lot better conditions" (G2). Thus, the evidence suggests that women in the industry perceive that the higher the salary DCI workers received, the less likely they would have a life/work balance. In general, women valued both salary and life/work balance.

2E) CUSTOMS AND PRACTICES PROPERTY

Participants identified a diverse range of customs and practices that can influence women's participation. A widely-recognised industry practice was that of working long hours. Secondary sources of data confirm that unappealing working conditions are a characteristic of the games industry. For example, a keynote presentation at the 2004 *Australian Gaming Developers Conference* discussed staff morale, crunch time and unpaid overtime, and identified that the Australia's games industry was "*characterised by many of the poor working conditions being debated overseas*" (Appendix 17, Item 37).⁷⁰ Thus, the evidence suggests that there is a perception that working in the DCI entails long work hours.

However, participants in the current case study noted their hours of work were mostly reasonable. Table 36 summarises the hours worked per week by participants interviewed in Phase 1. One participant suggested that her previous position as a schoolteacher had required her to work longer hours than she did in the games industry. Thus, the notion that working in the DCI entails long working hours can be challenged by the findings.

Table 36 Hours worked by Phase 1 participants

ID	Organisation	Role	Time in role (months)	Time in industry (months) *	Average hours/wk
M1	Multimedia	Creative Director	20	20	42
M2	Multimedia	Multimedia Developer	30	70	40
M3	Multimedia	Software Engineer	14	14	40
M4	Multimedia	New Media Producer	16	60	45
M5	Multimedia	Web Developer	6	24	40
M6	Multimedia	Web Developer/ Designer	11	18	30**
G1	Games	Production Assistant	18	18	38
G2	Games	Junior Props Artist	18	44	50
G3	Games	Artificial Intelligence Programmer	8	54	40
G4	Games	Project Coordinator	6	24	40
G5	Games	Assistant Producer	11	24	40
G6	Games	Games designer	26	26	50

*This did not include any volunteer work (for example, time volunteered when a student, or personal time spent developing skills or a portfolio). ** This participant was the only one in the study who worked part-time.

⁷⁰ The 'spouse' in the EA case now provides a website that reports on the conditions of work in games organisations: <http://www.gamewatch.org/phpbb3/viewforum.php?f=6>.

The practice of working long hours differed between public and private organisations. Private organisations demanded longer work hours, and public organisations were seen as offering greater flexibility: *I'm assuming anything that's private has no work-life balance, straightaway* (M7); and *"Yeh I think in the private industry I think you're going to have to dedicate more than just 9-5 hours, not only just for your job...but also the out of work hours"* (M2).

The two women interviewed from the public sector put forward that the main attraction of working in public organisations was the life/work balance they offered: *"Work life balance is quite important in the government"* (M2); and *"The people are fantastic, very, very flexible and when you think about the future and thinking when I have a family, there's no way in the world [you'll] work in the private sector, no way in the world"* (M7). For those participants working in private organisations, there were few role models who had achieved the life/work balance: *"I haven't really seen anyone in the games industry perfect the balance"* (G2). Although several participants suggested that public sector organisations offered better life/work balance, one participant working in the public sector (who had a child) identified that there remained difficulties in managing family and work responsibilities: *"I'd like a balance, I don't know, it's kinda hard, sometimes I get really frustrated"* (M4).

The practice of working long hours manifested for several different reasons. These included poor management practices, demands of overseas publishers, and unrealistic production deadlines: *"In the beginning we used to work insane weeks I mean 60-80 hours just to get a product through...A lot of it had to do with poor management"* (M4); and *"My manager basically promised certain deadlines...I think the management – it was a fantastic team but the management practices were non-existent in terms of understanding project management"* (M7). These poor management skills were to some extent to do with the newness of the industry: *"The way these companies are managed or not managed is not the same as many other more established industries"* (S1).

The actual hours worked differed across different roles. For example, those in Quality Assurance may work longer hours than concept artists: *"There are some people that aren't fortunate, like their role kind of mandates that they have to stay late, like QA, they'll have to wait for a build or they'll have to hang around to upload"* (G4). Other roles within the same organisation would not face these work demands:

So like my partner xxx was working on xxx as a concept artist so he got to go home every day at 5 o'clock, 5.30...whereas my mate who's working on the

same project as an animator he could be there to 1 or two o'clock in the morning...it is role specific, production type roles are quite easy 9-5. (G1)

In addition, there was a general perception amongst participants that programmers worked the longest hours. However, the experience of the programmers themselves was that they felt they worked reasonable hours. The game programmer noted that the hours she worked were *"pretty comparable to most of my friends who work in various industries"* (G3). A programmer in a multimedia organisation made a point that she had only been asked to work back a handful of times in the last year and, in each case, she was paid overtime. Thus, a blanket statement cannot be made to suggest that all roles in the DCI entail working long hours.

The practice of working long hours was dependant on structural characteristics of the industry, such as the project production cycles. Cycles could run for years; for example: *"The Nickelodeon ones they have eighteen month cycles"* (G4). Long hours tended to manifest around *"crunch time"* (G4); that is, towards the end of a cycle when a product was required to be completed by a particular deadline. The long hours were also dependant on the projects themselves: *"The last few projects we worked public holidays and we worked a Wednesday evening and then sometimes a Thursday evening and it was expected, whereas now it's like if you don't sort of have the work you don't have to stay"* (G7). If projects entailed participants learning new skills then this contributed to the long hours they worked. If participants could use existing skills, there was less of an expectation to upskill or *"go home and do a lot of research or do a lot of learning stuff"* (G7). A multimedia programmer noted that when she was required to learn a new skill—for example, a programming language—she was given extra time in her work schedule. Thus, the evidence suggests that the practice of working long hours can manifest differently depending on management approaches.

The practice of working long hours was not always an outcome of the environmental characteristics, but could emerge from the individual's actions: *"I think it's also coming from the individuals who establish that, not just the company. Because there are people who literally work themselves to death and we probably can't do anything about that. I think people set their own boundaries"* (G4). Some individuals worked long hours because they were invested in and 'loved' their job. Others did so in fear of losing their job; they felt they were *"kind of expendable as there are a lot of people looking to come into the games industry at the lower end"* (G2).

One participant identified that although “every job” she had involved long hours, she had contributed to these long hours: *“I guess it’s also up to the person. If you like to tick everything off for the next day [...] sometimes you have to invest a little bit more”* (G5). Another participant admitted: *“I’m sure people can do it in shorter hours, maybe it’s - I think sometimes it can be your personality. My personality, I can’t let that go until I know it’s okay”* (M9). Yet another (M7) suggested that it is an individual’s drive to produce quality work rather than “*bad products*” that sustained the practice of long hours. A stakeholder described the pressure to work long hours when aiming to develop quality products: *“Like you’ve got school leavers who are ambitious and want to prove that they’re really, really into this but there are others – a whole wave of them waiting next year. So this ambitious student goes in, gives their all, gets completely burned out by the time they’re 26 and gets spat out the other end and has to find a job that’s actually going to just pay the bills and give them room for a life.”* (S1)

The influence of long hours varied over time due to participants’ circumstances. For example, although some described enjoying the long hours when they first began their careers, this changed over time: *“I got to the point where I’ll never do that ever again”* (G8). For others, family responsibilities conflicted with the demands of working life. Even when they did not have children, these participants identified that working long hours would conflict with such responsibilities: *“I don’t see how I could have been a mum at that time”* (G8). Thus, the evidence suggests that the practice of working long hours varies among individuals.

Cultural practices manifested in other ways than the practice of working long hours, including the clothing people wore and the food they ate. For example, something as simple as the everyday clothing worn by workers appeared to be important. Thus, the influence of clothing is later discussed. Even the practice or custom of what foods one might be expected to eat when working in the DCI was raised in participants’ accounts. It was suggested that there is a “beer and pizza” culture that both women and men may encounter: *“So if you’re not a beer and pizza sort of person, it doesn’t matter whether you’re male or female”* (G7). A job advertisement for a games organisation suggests that eating healthy fruit is not the ‘norm’ in the industry context (Appendix 17, Item 51). Thus, findings reveal that everyday cultural practices such as dress, food and work practices can influence women’s participation.

2F) LEGISLATIVE AND POLICY PROPERTY

A participant in a public sector organisation emphasised that clear policies could support her participation. Section 5.2.3 further describes another participant's concerns about policies such as the Australian Workers Agreement (AWA). Although participants mentioned policies, they made little reference to macro level legislative characteristics that secondary sources draw attention to. For example, there was no mention of *The Equal Opportunity for Women in the Workplace Act (1999)*, which aims to address social inequity across the wider community. Further data and investigation of the influence of policy and legislation is warranted.

2G) HISTORICAL PROPERTY

Findings indicate that cultural influences on women's participation manifest as a result of historical properties, such as society's changing attitudes, technological innovation, and specific historical events. For example, society's attitudes towards playing games have changed over the last few decades. As one stakeholder noted, a decade or two ago games were "*demonised*" (S3), much like the novel was when it first appeared. Conversely, another participant noted that the games market had recently widened to encompass a broader target audience: "*Nintendo Wii is responsible for a lot of – like created an entirely new gaming market, like retirement homes have the Nintendo*" (S1). Thus, digital content products may now be more appealing to a more diverse range of people than they were in the past.

Access to technology has also changed over the participants' lifetime. Access to technology, such as computers, during their youth was integral to women's overall participation as it provided an opportunity for skill development. However, women faced challenges in accessing computers, as they were simply not readily available during their childhood and teenage years:

Whenever that was, 1994 or 1995, like there probably wouldn't have been a lot of people necessarily who even had their own like computers in their houses or if they had a computer they probably wouldn't have had the internet. (M8)

One stakeholder attributed the under-representation of women in the industry to the reason that, historically, men formed the majority of technology users. The same stakeholder revealed that in the last two years, only 2 of the 20 Flash developers in his organisation were women.

Interactive media, the websites, came very much from a programming kinda base and mostly that's an IT related, male dominated sort of domain" thus "there's a natural bias towards males in the industry because of the nature of the

way the industry has evolved...I don't think there's any reason why there shouldn't be women. I think it's a historical reason. I think it takes time for these things to change through generations...Where typically in the 70's and 80's, you know, when computers were evolving it was a male dominated area. So, it's not surprising that there aren't more women; I'm not surprised that there aren't a lot of women in the industry. (S3)

Another stakeholder also attributed the low number of women to historical events; but reflected that although they had *"absolutely no idea"* why under-representation occurs in the DCI context, it was for the *"same reasons that girls haven't been engaging with IT for forever"* (S2). As the comment below suggests, secondary data challenges the empirical data. Where stakeholders suggested historical reasons for women's under-representation, secondary sources suggest that the newness of the technology related industries should somehow negate the historical biases and inequitable practices:

It's a relatively new field and people come in at relatively [the] same education level, [...] there has been a historical bias in many older fields reflecting past attitudes that men worked to support a family and women worked for pin money [...] In IT, you may have started with a level playing field. (Appendix 14, Item 27)

Games organisations were perceived as having an emerging status, and this lead to immature work practices: *"This industry is still going through its adolescence I think. It's not mature enough"* (S1). The recent introduction of DCI-related degrees at universities reflects this emerging status: *"So this is just starting to happen in a way. All of these game design courses are only just coming online"* (S2). The games industry is typified as arising from 'garage' style practices: *I mean it's funny we as a company or as an industry spend a lot of money on trying to understand organisational stuff and because I come from an industry where that's already defined, it's pretty clear cut...in the games industry they're sort of muddling along so they haven't really got that sorted out; that's the age of the industry. (G7)*

In contrast, participants perceived multimedia organisations as being more mature than the games organisations. Multimedia organisations were more appealing because they strongly aligned to established industries (those with a history and established work practices) such as publishing and advertising. It was a *"really integrated industry"* (M9). Thus the differences between the multimedia and games organisations warrant further investigation:

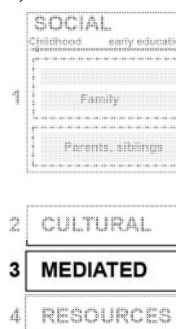
The interactive industry these days is more aligned with the public relations or the advertising industry or the just think of social networking and social marketers...so the multimedia industry or the interactive industry that AIMIA

represents certainly is a much more modern organisation with broad communication objectives than the internet industry where it was all sort of ISP's working out of garages making websites for people... (S3)

Historical events, including global economic events, could influence women's participation. Participants identified that both the dot.com crash of (2000) and the Global Financial Crisis (GFC) could have influenced women's participation. It was perceived that these events lead to limited career opportunities and lower salaries: *"This is also about times because times have changed and people are paid a lot more conservatively in the games industry than they were 10 years ago"* (G7). Several participants mentioned that the influence of the 2001 dot.com tech bubble manifested well after the event: *"Tech bubble...so the terrain had changed and, yeah, the web design companies weren't really doing that much hiring. I was certainly looking for web jobs and I didn't get offered anything"* (G8).

The 2009 global financial crisis (GFC) occurred during data collection and may have contributed to the closure of one Brisbane games organisation and the redundancy of approximately 80 people. Participants from another organisation noted that the global event would lead to a lower number of local employment opportunities. The *"amount of like students being able to get jobs in games is going to really go down"* because *"companies are not viable and positions simply are not there"* (G7). The participant suggested it would remain this way for 18 months to 2 years (they were interviewed in 2009). That historical economic event would affect women's and men's potential for participation for a number of years. As an addendum, three of the four Brisbane-based games organisations in this case study faced major staff redundancies or closure in 2012. Thus, the evidence suggests that characteristics such as economy and history can interact to influence women's participation.

3) MEDIATED DIMENSION



The mediated dimension recognises the influences that manifest through the media, in contrast to the in-person interactions within the social dimension. A stakeholder, with several years of experience in the industry, suggested the influence of the media *"surfaces time and time again"* (S2). The media includes properties such as mediums including television, literature, magazines, and digital products such as games.

These media convey social messages, such as norms. Table 37 lists several of the mediums and messages identified by participants, and those found in secondary sources of data. These messages include the messages that women do not

work in the industry, and that the industry is associated with males. The following participant's comment highlights that the media influences through the messages it conveys:

There's been a real amazing amount of backlash against the kind of independence of women in the workforce I think over a period of time. We're talking about subtleness which appears on TV; in you know interviews with people, in movies, magazines and all of that sort of stuff and it all kinda progressively adds up and congeals on the surface of what people perceive as the IT industry and women's success in it. (M5)

Table 37 Examples of the types of media and messages within the mediated dimension

Medium	Example of message	Evidence
Television	Lack of female role models and appropriate images of women; stereotypical images of gender roles	G10, G5, G3
Industry magazines and events	Sexualised images of women appeal to males	Appendix 17: Items 7, 21, and 25
Internet	Advertisements for porn when accessing software sites	Appendix 17, Item 20
Games	Sexualised imagery of women appeal to male audience	G6
Promotional material	Conference featuring male majority	M1, Appendix 17, Item 6

Media can convey gender stereotypes. Secondary sources indicate that industry initiatives, such as the 2011 Telstra FITT International Women's Day (IWD) Luncheon, recognised that “women are still either stereotyped or ignored in the media” (Appendix 17, Item 55). Furthermore, the negative image of those involved with playing games is *“exacerbated by all sorts of media events”* (S2).

Of the various mediums, **television** was mentioned by several participants. One noted her concern with the medium's inaccurate portrayal of women's capacities and enjoyment of working in the industry: *“I'm just utterly shocked just in the advertising and in the shows, the gender stereotypes that are still on there, now. [...] it doesn't fit in my day to day life. The kinds of things I see women doing and men doing doesn't really fit into that stereotype I see on TV”* (G3). Women were not only misrepresented but television provided very few role models to women in the Australian DCI over the last decade. A review of secondary data sources indicated that, in 2006, a television program dedicated to reviewing games products was introduced on the ABC in Australia (See Appendix 17, Item 39).⁷¹ However, the first female presenter was introduced in 2009, three years after the program first aired.

Women were also under-represented in the internet-based medium of **websites**. For example, a time-based analysis of the front page of a games industry website,

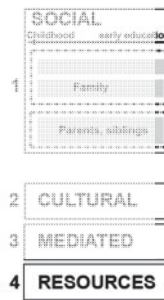
⁷¹ The website accompanying the television program has a backlog of broadcasted episodes from 2006 to the present.

Gamasutra, indicates that women's presence changes from minimal in 2001, to stronger in 2008 (See Appendix 17, Item 29). Similarly, resources available on the internet (such as pirated software) appear to target males. Following up on a participant's comment about using a particular software package, 'Dreamweaver', the researcher conducted a search in 2007 for this software on the internet. The search results led to several websites that listed the software alongside links to pornographic images of women and live sex shows (See Appendix 17, Item 20). Thus, this internet-based resource may be sending a message that industry-related software is used primarily by men. However, a similar search in 2009 revealed that sites where the same software could be downloaded featured pictures of cute puppies (Appendix 17, Item 56); such images are less sexist.

Women were under-represented at industry conferences. One participant identified that the majority of speakers at industry conferences were male: *"For example, every year I go to two big design conferences. One is in Sydney, Semi-permanent, and one is in IGDA in Melbourne and its funny most of the speakers are men"* (M1). Women were also under-represented in the associated promotional material for these conferences. An interviewee in an article featuring women in web roles noted the low rates of participation of women at conferences: *"With the exception of a women's blogging expo, the number hovered at only around 15 per cent. The results are largely anecdotal and have been contested by some of the conference organisers, but it does paint a fairly gloomy picture"* (Appendix 17, Item 52). Secondary sources, such as flyers and websites, also indicate that men form the majority of speakers at international games conferences (See Appendix 17, Item 6).

In addition, participants noted that media such as magazines that are typically associated with women—for example, Cosmopolitan—did not promote the opportunities available in the DCI: *"Whether it's from movies or TV or things in magazines, like when you keep reading Cosmo or whatever and I never saw any articles... They'd never in a million years have it on the radar that programming... Like it's an amazing career. They wouldn't really know that"* (M9). Furthermore, women are under-represented in industry-related magazines. A random review of one issue of a key industry magazine (in the UK and Australia) revealed that a majority of the industry members featured in the articles are male (See Appendix 17, Item 30). For example, of the nine featured creatives, only one is a woman. In the same magazine, an article features six authors, all of whom are male. Similarly, the judges of a featured design competition are all male. Thus, the evidence suggests that the mediums of television, internet and promotional material can influence women's participation.

4) RESOURCE DIMENSION



The resource dimension recognises that access to resources such as technology, information, and networks (with other people) is an influence on women's participation. For example, having access to technology such as computers from an early age was an important influence, particularly when computers were not commonly available in the wider community at the time most participants in the study were children (between the 1970s and early 1990s). Family members, in particular fathers, could facilitate access to these resources: *"My dad's a programmer so we always had a computer around" (G3)*; and *"I had the computer there. I just got interested" (M7)*. Access to other resources, such as magazines and books, also fostered skill development. One participant described reading a book on programming before she even had a computer. As is the case for the previous three dimensions, resources manifest at different lifespan stages, as indicated in Table 38.

Table 38 Examples of resources across a lifespan perspective

Resource	Childhood	Early education	Late education	Career	CoP*
Hardware (for example, computer)	x	x	x		
Software		x	x	x	x
Magazines and print media	x	x			
Chat programs			x		x
Websites (industry)				x	
Financial (monetary)			x		

*examples of resources used by Communities of Practice (CoP)

Resources that provided information relevant to employment opportunities appeared pertinent in late education and early career. Participants utilised the internet for job hunting, including online industry forums, online recruitment and a Queensland government website (M7)⁷². Several women and a male freelancer noted the value of gaining information from these resources. Secondary data sources also support the contention that accessing social networking sites such as LinkedIn provides access to the "occasional job postings" (Appendix 17, Item 9):

There are online forums as well. There's a lot of those where you can get the latest information of what's happening industry wide. You can have people who might be in the industry anonymously having a bitch about what's going on within a certain company. You can get inside information that way which can be helpful to give you a bit of an insight. (S1)

Accurate information regarding working in the industry was required when participants were making career decisions while still at school. However, the male

⁷² Seek.com is an online recruitment websites. The government website is: <http://jobs.qld.gov.au/>.

freelancer noted that, in general, students would *“definitely not know about such resources ... I don’t want to stereotype, but they’re young, they don’t really have an idea”* (S1). Secondary data supports the finding that there has been a lack of information regarding career choices for the games industry. For example, a blogger recounted the comments that two women employed in the Brisbane games industry made at a games conference event:

Regarding the lack of women with careers in gaming, it became clear that the industry is not exactly well publicised as a career choice - both Penny and Hannah said they both had no idea you could even HAVE a job like that, until they basically fell into it. (Appendix 17, Item 43)

Financial resources were indirectly identified by two participants. One participant (M4) highlighted that her mother paid for her study and bought her a computer; in her mid 20s she was waitressing and could not afford these resources. The mother’s financial assistance was seen as instrumental to the participant’s ability to pursue a qualification in multimedia. Another noted how difficult it had been to pay for her education. Thus, it can be seen that access to financial resources can foster access to other types of resources.

5.2.2 THE PERSON (P)

Environment (E) Person (P) Interaction (I) Having described the Environment (E) category or dimension, the focus of the findings now shifts to the second category in Framework 1, that of the Person (P). Findings indicate a person can be described by their social identity. As Figure 14 illustrates, the dimension of social identity is comprised of two key properties: 1) gendered identity, and 2) the DCI occupational identity. Age and ethnicity were noted to a lesser extent.

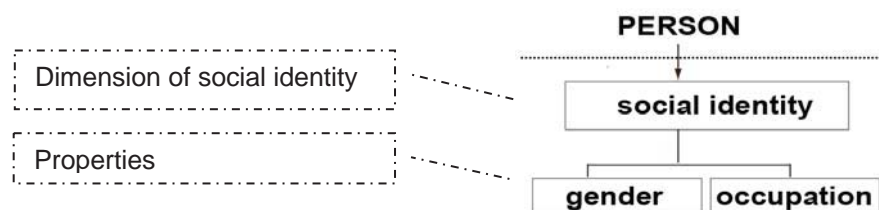


Figure 12: Refined Person (P) category

1) GENDER PROPERTY

Findings indicate that the participants’ socially recognisable gender could be an influence. The female participants often felt judged against gender stereotypes relating to women’s capacity and interest in technology and DCI careers. For example, participants

reflected that educational practices socialised women away from technology-related careers in the education context:

It's becoming what woodwork and metalwork became and home EC [economics] for girls and woodwork and metalwork for boys and now it's sort of like film studies and multimedia for boys and creative writing and art for girls and it's still that divide. (G1)

Secondary sources of data indicate that even strategies that aim to foster women's involvement may at times use language that reinforces stereotypes. For example, an email announcing a technology scholarship for girls refers to the girls as "young ladies" in the subject line (Appendix 17, Item 45). Even 'research' may carry a message that implies that 'normal' women are not suitable to technology-related careers. For example, an article reports that *"women in technical careers have 'male' brains"* (Appendix 17, Item 46). An Australian professional gamer noted in an online article that women face challenges in participating as gamers because they are identified as being 'women': "Gender sort of is a big deal and a lot of girls take flak not for anything except being girls" (Appendix 17, Item 22). A blogger reporting on a public games forum held in Brisbane (2009) stated that she is pleased that one of the presenters made the point that she is a "normal" woman who also enjoys playing games.

Thus, a tension appears to manifest between what was described as 'normal' women (linked to gender stereotypes) and those working in the DCI. Participants distanced themselves from certain types of women. This distancing was interpreted by the researcher from women's comments that they were not like other women: *"You're not quite the same as the other girls"* and *"you're not really into the makeup and things"* (M2). 'Other women' were also defined by one participant as not having technical skills: *"I can't imagine a really girly, girl working here but if she had the right skills I think they'd [male colleagues] just love it"* (G4). Even the *"power-suited"* women in the IT industry were seen as *"a little weird"* (M3). The sense of distance one participant felt from the image of these women in IT influenced her pursuing a career in games production. It was *"one of the reasons why I got into games"* (M8).

This distance from 'normal' women may explain in part why several participants did not personally identify with either masculine or feminine traits, but rather, as one participant suggested, she was *"stuck in between"* (M2). Others made a point that gender was not an important aspect in regards to working in the industry: *"In the games industry it doesn't matter if you're a boy or a girl; it matters how good you are"* (G7). One participant stated: *"I don't even really notice that I'm a different gender, it's a non issue"* (G4). Another noted that when she first started her university education in multimedia, gender was not a concern: *"I never came to a degree thinking it's going be male or female. I never came with that perception in my mind"* (M7). Thus, the evidence suggests

that the social stereotypes women face influence their participation. However, the women in the case study had different, individual experiences of, and responses to, gender stereotyping.

Most participants indicated that the stereotyping was generally manageable. This is exemplified by the following example where the only female games programmer says that although people seem “*shocked*” or “*surprised*” to find out she is a “*female programmer*” (particularly when she attends interviews), she downplays its significance and describes it as “*just, small, no big deal*” (G3). For others, however, their gendered identity became a constraining influence when it surfaced in their day-to-day interactions and ‘triggered’ participants’ feeling as though they were being judged against a stereotypical gender characteristic; for example: “*We have lots of fun just sitting in the office and having a good time but there's just some occasions where I do feel like...that's right I'm a girl*” (G1). When women experienced certain conditions that reminded them of the stereotypes surrounding their gender, there were a number of consequences. These included realising that they were in a “minority”, that they felt “different” to their male colleagues, and that they felt judged (or they even judged themselves) according to the stereotypes surrounding them. One participant recounted her experience in Japan (as she was required to travel there for her role). She suggested that such constraints could be worse because:

Over there, there's no one female as a technologist...So sometimes when I go over there representing Europe, I feel that they are uncomfortable dealing with me...sometimes it's a bit grating. I found often when going to meetings with one of my subordinates, who is a guy, and meet people and they just assume that I'm like the tea lady or something and not even look me in the eye. (G8)

The stereotypes that suggest that women do not have technical proficiency often left women facing extra pressure when interacting with colleagues:

When I deal with technical guys they almost want to test you and they assume you have no idea about anything technical...They don't just take you at face value, whereas they would a guy. They assume a guy knows. I think it's very difficult to be a female in this industry because potentially you have to work so much harder to get noticed and to get the same level. (G8)

This placed women in a position where they felt that they needed to prove their capability as DCI professionals: “*We're there so we might as well show that we can do it just as well as they can...It's not necessary but I think just when you can prove everything they can do...it's kind of just gratifying*” (G5). For others, there were some advantages of not being perceived as not being technically proficient because of their gender:

I never get asked to help out with all the crap jobs that the guys get stuck doing [...]I'm not expected to learn all the technical non-web dev stuff like working with servers[...] the (male) programmer (with no prior knowledge) is constantly hassled to help out. On one hand it kind of bugs me that I'm instantly excluded just because I'm a girl, but it is good because then I'm not constantly being interrupted. (M6)

In addition to women pulling away from a stereotypical gendered identity, many experienced the pressure to fit in with the male majority—often referred to as the ‘boys club’: *“As I am the only female on my team, it can at times feel like a ‘boys club’”* (G1); and *“it is gender centric, in that it's very much a boys club”* (G7). Men are seen as being capable with technology and thus they become the norm or measure in the work environment. If a woman wants to *“make a game”*, she just has to be *“as good as the boys next to them, that's it”* (G7). One participant suggested that there were two types of women in the games industry. Those women that fitted into the boys club were the *“hard nuts”* who *“all sort of get in there and play poker and have the odd swearing match and it's fun”* (G7). Being one of the boys means *“you're part of the group”* (G7). Less was said about the other women's approach; however, it was suggested it involved asking for *“help all the time”* (G7). Regardless of the approach, the participant suggested that women responded by adapting to the characteristics of the environment: *“So I think it does attract a certain type of female sort of personality type but I think you probably find that a lot of women actually just sort of deal with things that they don't like probably a little bit better than men, like you evolve to their way of thinking”* (G7). Similarly, another participant suggested that women adapt to the conditions they find themselves in: *“It can be difficult sometimes working in a very male dominated industry. Sometimes you just get used to it. Your whole career you get used to it”* (G8).

Participants recognised inaccuracies in stereotypes. Stereotypes could be both *“valid”* and not offer *“an accurate picture”* (G10); and *“Sometimes there's some truth in stereotypes but there's also a lot of grey area”* (G4). Participants' accounts suggested gender stereotypes were more pervasive than occupation stereotypes. One participant noted she held stereotypes about certain occupational roles; for example, that male programmers were ‘geeky’. Reflexively, she articulated her awareness of the inaccuracies of the stereotypes; not all male programmers were unattractive: *“There's a couple that are but then there's a lot that aren't”. “There's this idea that all male programmers are going to be overweight and big glasses”* when in reality they are *“good looking”* and *“a lot are body builders and surfers”* (G4). The participant perceived that not all programmers were geeky, but that most programmers were male. Further investigation of the influence of gender stereotypes is warranted.

2) OCCUPATION PROPERTY

Participants identified three characteristics of the DCI occupational identity. There is: 1) the passionate worker, 2) the technical and creative worker, and 3) the geek.

1) Both the female DCI professionals and stakeholders noted that DCI professionals are passionate. One suggested that the only reason you would enter the industry is *“because you've got a passion for games”* (G1). Another suggested that *“most people end up in multimedia because they have a passion for it”* (M4). Participants valued working with *“like-minded individuals who are passionate”* (G6). Participants also suggested that being passionate was as important to employers as the skills an individual possessed. Secondary sources of data further support this view; for example, several job advertisements for roles in the Australian DCI indicate that suitable candidates would be “passionate” and work alongside other “passionate people” (See Appendix 17, Items 21 and 24). In the international IGDA diversity survey, several respondents mentioned the need for passionate workers. One claimed that: “Overall, positions in the industry are typically filled with passionate individuals that have competence in their field” (Appendix 17, Item 28-F, 39, White, Uni, USA). Another believed that “Game development shouldn't be a job but a passion. I don't have any problem with girls working as game developers, as long as they have a passion for it” (Appendix 17, Item 28-M, 26, White, Ma, Belgium). In general, both women and men could be passionate: *“I love games and creating games and I don't see any barriers because I am a girl. I think if you are passionate something, then you go after it”* (G6). However, two stakeholders suggested women may be perceived as not being as passionate as men. Passion was often linked to spending long hours developing skills. It was viewed that if women had not had as much exposure to resources such as games in their youth, then they may not be as passionate as a male. Although passion was an important characteristic of the DCI worker, women faced stereotypes regarding their capability to be passionate.

2) The second characteristic of the DCI professional is that they possess both technical and creative skills. However, women faced challenges in being perceived as having technical skills due to the gender stereotypes. Women were not associated with technical roles such as programming: *“I think there's more stereotypes against female programmers. I've only met one other female programmer...but quite a few artists and I think the artists face less stereotypes and just more the environment issues like being in a boys club and that sort of thing”* (G3). These stereotypes, may explain why there are fewer women in roles such as programming that are considered highly technical.

Whereas programming roles were associated with male workers, females were perceived

as being better at administrative tasks and project management; this led to a work environment where *“men did programming and women paperwork”* (M2). These perceptions of the genders were perpetuated by the *“stereotypes and jokes floating around”* suggesting such things as women being good at the *“communication side of anything”*, and men being *“terrible”* at communicating (M2). A stakeholder described how he wrote different recruitment advertisements to ensure equitable numbers of men and women applied for his interactive development team. He believed women would apply for project management roles and men the technical roles, such as Flash development.⁷³ He suggested that women might see communication-based roles as a career option, as communication skills are stereotypically linked to women. This may explain why multimedia organisations were perceived as presenting fewer barriers to women than games organisations: multimedia had *“evolved more towards communication media and attracts a broader spectrum of people”*, whereas *“games”* and *“animation”* is more a *“production environment not a communication environment”* (S3). Participants also identified that even where a women’s primary role was technical, they often undertook administrative tasks: *“Maybe this is where the ideal of the sexes come in but women take on a lot more of the administrative sort of roles”* (G7). One participant in what might be defined as a creative role (as an artist), even noted that she took on more administrative tasks because:

I’m a girl...because it’s something I’ve done before but also something that I seem to be a bit better at than the chap who sits next to me. So we seem to – it’s not surprising that we have what we do as an artist but then we’ll take on some administrative tasks whereas a male might not take on the administrative areas. (G7)

Thus, findings indicate that women face occupational segregation in the DCI.

This segregation could be amplified because the career pathways in the DCI encourage distinctions between technical and non-technical skills. One participant lamented the fact that she had to choose either a technical or managerial role, as *“there’s no in between”* (M7). Although technical roles appeared valued, one stakeholder (an employer) pointed out that entry level programmers of packages such as Flash⁷⁴ were seen as dispensable. He went on to say that he would actively discourage his own son from pursuing a Flash developer career path as it had limited career progression options, a capped salary, and because entry level roles did not offer any level of control in the production process. This stakeholder suggested that women were at an advantage because they pursued non-technical career pathways.

⁷³ Adobe Flash is software that requires knowledge of the Actionscript programming language.

⁷⁴ In the late 2000s, Flash was a key software package for multimedia product development.

Findings also reveal that the stereotypes for DCI programmers and ICT programmers differ. One participant described how multimedia programmers are *“very, very different than those working in IT”*. She described those in IT as being *“just a different breed...I think the way their brain works or something is different than it does with multimedia, not just with my experience and my exposure but in teaching them and with working with them”* (M7). She made a particular point that IT programmers may not function well in a team environment because their *“communication skills are zero”*. Communication skills were highly valued within the DCI, particularly as labour is often organised in teams. Thus, findings indicate that although technical skills are often cited as a trait of DCI workers, the nature of technical roles varies and other skills are valued in the DCI.

3) The third characteristic of the DCI worker is that they are strongly associated with the ‘geek’ identity. Being a geek in general was not seen as appealing. Geeks were described as *“slightly unpopular, no life, no girlfriends”* with *“dubious body hair”* (S1). There is a *“perception of strange geeks sitting all night playing games and absolutely unable to be social in anyway”*, which leads to the industry being a *“place that's kinda of uninviting”* (M1).

The reason Workforce diversity isn't happening is due to the negative stereotypical image of gamers. If gaming was 'cooler' and games appealed to a wider audience then people from that market would be interested in joining the industry. (Appendix 17, Item 28- M, 19, White, HS, Australia).

Industry and education initiatives have tried to change these negatives connotations. One university program had tried to *“sex up the image of the program now in schools”* as the DCI had no *“sexy geeks”* (S2). Similarly, secondary data indicates that there are initiatives that try to redefine the image of the geek. The Sexiest Geek Alive⁷⁵ pageant promotes the “sexiness of geekiness” (both male and female), thus recognising that IT is “not one of the sexier professions”⁷⁶. Other initiatives promote ‘geek chic’ (Appendix 17, Item 44), a term suggesting that being a geek is fashionable. Being a geek did have appealing aspects when associated with technical capability. This may explain why one participant described herself and her colleagues as *“proud geeks”* (M7). The geek is associated with technical ability in most programming skills: *“They see them as geeks in terms of they think it's programming”* (M7). Like passion and technical ability, the geek is also associated with the male gender. Participants referred to male colleagues as ‘geeks’. However, participants also recognised that they themselves viewed their colleagues stereotypically: *“So I don't know to be honest I probably see them through*

⁷⁵Sexiest Geek Alive pageant at http://archive.salon.com/tech/log/2000/03/07/sexiest_geek/index.html

⁷⁶ As reported online in popular media at <http://news.ninemsn.com.au/article.aspx?id=284665>

some stereotypes" (M1). The influence of stereotypes surrounding identities such as the geek warrants further investigation.

3) AGE AND ETHNICITY PROPERTIES

Along with gender and occupation characteristics, age and ethnicity was noted, but to a much lesser extent.

Findings indicate that participants in the DCI are young, or at least it is perceived as a young person's industry: *"We are a very young group; so I'm 23 and like I know that a lot of us are in our 20s"* (M8). Similarly, the IDGA Diversity Survey suggests that the DCI workforce is comprised of people under the age of forty: "Very few female game developers...Age diversity is pretty good, but there are few over 40 that I've seen" (Appendix 17, Item 28, M, 37, White, HS, USA).

One participant, who was aged thirty, identified that both her gender and her age made her feel different to the majority of workers in her organisation. She noted that although she was in her early career (having recently left her teaching career), she was as old as her manager and older than a majority of her peers. *"On a superficial level...you're at a disadvantage if you decide later on that it's an industry that you'd like to be a part of"* (G2). Although perceived as comprising a young workforce, the industry faces challenges as this workforce ages: *"When I look at when [partner's name] started and he's been in the industry for 13 or 14 years now, most of the people were between the ages of 19 and 25. And now there are people having their 40th birthdays. So it's grown up. It's definitely grown up"* (G7). Secondary data suggests that the ICT industry faces similar issues surrounding ageism in its workforce (ACS, 2010). These initial findings suggest that the properties of gender, occupation and age (within the social dimension) may influence women's participation and warrant further consideration.

The ethnicity of women in programming was mentioned by two participants. One participant (of Asian heritage) offered an explanation of why there were a higher number of Asian students in many of the Australian university courses related to IT. She said that her friends knew that by choosing to study an IT course, they would have a better chance of emigrating to Australia. She recalled how she had been asked to help tutor a new arrival because *"he picked a Master degree in IT [Information Technology] and he doesn't even know what IT is about ... it's just because of the migration policy"*. She continued by saying that, for female migrants, *"IT will be more attractive no matter if they are interested or not"* (M2). Thus, the findings indicate that influences such as government migration policy and ethnicity manifest in complex combinations.

5.2.3 THE INTERACTION (I)

The literature review identified the need to investigate the interactions between the two entities of Environment (E) and Person (P). The previous analysis of empirical data resulted in a rich description of the first two categories (E and P) in Framework 1. Although this process sensitises the researcher to interactions between those categories, further conceptualisation of the interaction (I) category using inductive analysis reached an analytical impasse. To move the research process beyond this impasse, further analysis of the empirical data focused on identifying specific events of interaction. Although Danermark et al. (2002) did not explicitly focus on the analysis of events, this analysis can be seen as aligning to Stage 2 where entities are further ‘resolved’. The choice to focus on events is supported by the Critical Realist ontology underpinning the research. Bhaskar suggested that there is a need to identify the events in the ‘actual’ domain of reality (as discussed in Section 3.3.2).

EVENTS OF INTERACTION

Environment (E)— Person (P)

Interaction (I)

The 18 women interviewed recounted several events that influenced their participation. An event is defined as ‘a memorable or significant occurrence for the participant at a particular temporal or spatial point’. In exploring the E and P categories, the findings do, to some extent, describe several events. However, the emphasis has been on a description of the characteristics of the environment and person, and not on events. In addition, many of the events—such as the dot.com crash of 2000 (tech-bubble), and the global financial crisis (GFC) of 2009—have manifested at the macro rather than micro (organisational level). This section reveals the events at the micro level. Rather than natural or historical events, the emphasis is on the analysis of the everyday events women experience in the DCI organisation. Nevertheless, there is some reference to events that occur at different points of the lifespan perspective, at the macro and other micro contexts (such as school); this is because the overall aim of the study is for holistic understanding.

These events manifest at both an individual and group level. For example, at the group level, each of the participants highlighted that the ‘event’ of entering the industry was an integral influence on participation. At the individual level, the actual experience of entering the industry differed for each person. Group level inference lead to the conceptualisation of 10 events that manifest in the interaction between an individual and their environment. These 10 events are presented in Table 39 in a way that reflects when they are most likely to occur across a typical lifespan. This does not imply that these events must occur in this sequence. For example, as the first event ‘Learning recipes’

identifies, participants may learn skills in their youth and also face the need to maintain those skill in the adult careers. Empirical evidence supporting this conceptualisation of the 10 events of interaction is now presented.

Table 39 The 10 *Events of Interaction* manifesting in the ‘actual’ domain of reality

Childhood/ education	Career	Future career
1) Learning Recipes	4) Ladies Lunches	9) Motherhood
2) Getting In	5) Muffins and Men	10) Greener Pastures
3) Just Like TV	6) Catch 22	
	7) Mind Your Manners	
	8) Are You the Entertainment?	

1) LEARNING RECIPES

The first event, ‘Learning Recipes’ recognises events that foster skill development opportunities. Several participants indicated that learning computer-related skills in their childhood fostered their later participation in DCI education and work contexts. One participant recalled that, as a young girl, she had gained skills in programming by following the coding ‘recipes’ in her father’s computer magazines (G2), which then helped her develop a sense of being skilled in using software. She highlighted that it was not necessarily any direct intervention from her father, but rather access to a resource that helped her learn coding: *“My dad would get commodore 64 magazines and so I’d just copy out programs and write games cause in the same way that recipe books give you recipe”* (G2). The participant also noted the link between such childhood experiences to the skills her fellow ‘male’ colleagues had acquired; these males held all the senior programming roles in her organisation:

There a couple of work environments that are just males and I don’t know if they’ll ever get a female [which environments are those] The engine for example, just umm very senior programmers that have been programming for fun since they were a kid. (G2)

Beyond childhood experiences, participants also noted the importance of developing and maintaining skills in the education and workplace contexts. One participant, who worked in a public service/government organisation, felt a negative of their work environment lay in the limitations surrounding skill maintenance or development: *“For me not to develop anything for half a year is really, really bad skill-wise. ... [...]So yeah, I think that’s my biggest hurdle ... I have no way in government to develop my skills [...] but then work-life balance”* (M7). Developing technical skills enabled women to challenge those stereotypes that suggest that females do not possess technical capability. When women mastered the technical skills associated with the DCI occupational roles, they developed a sense of confidence: *“I’d never really done any front end interactive scripting before I came here so I had to pick up really quickly and I was just like, oh, it’s actually not as hard as I thought”* (M5). Maintaining technical skills often

demanded a great deal of commitment from participants, and this was seen as a negative influence on participation.

2) GETTING IN

The second event, ‘Getting In’, recognises events that foster participants’ entry into the industry. Several participants noted that one of the most difficult aspects of participating was in gaining initial access to the career pathway: *“I think it’s very hard to get that first foot in for anybody, especially women”* (G5). Secondary sources, such as interviews of women working in web design in the UK also indicate that access into the industry presents a particular challenge to women (Appendix 17, Item 52). Table 40 summarises the variety of ways participants gained entry into the DCI. It is noteworthy to recognise that a majority of the participants in the study had a personal contact facilitate their entry into the industry, in contrast to only a few that had replied to traditional or online recruitment advertisements.

Table 40 Female interactive content creators’ access to the DCI

	Method of entry into the industry/current role
G1	Approached a mentor who offered work experience, then worked with boyfriend in same organisation
G2	Met DCI workers while working in a café; formed a good relationship before applying for a position at the organisation
G3	Applied for first position; access to second may have been assisted by knowing people at the organisation; moved to second organisation with partner
G4	Boyfriend offered a job at the organisation; facilitated participant’s entry when opportunity arose
G6	Responded to online job advertisement
G8	Freelanced as a web designer
M1	Was freelancing and current employer was a client
M10	Studied marketing and got an initial position in an advertising agency; then moved into DCI role
M3	Helped by student program which facilitated access into studio environment; informed of available position by fellow female student (who had gained entry)
M4	Helped by student program which facilitated access into studio environment; networked with clients to change occupation; current partner in multimedia
M5	Male friend put name forward at the organisation; previously had numerous job applications rejections
M6	Informed of opportunity by flat mate; current partner in games organisation
M7	Informed of position by friend
M8	Informed of position by university lecturer

Findings indicate that a person’s skills, serendipitous opportunities, industry recruitment practices, and access to networks could all influence an individual’s entry into the DCI. Access into the industry was seen by participants as being highly competitive, particularly for entry level roles; however, access into certain roles was seen as easier than for others. For example, QA (Quality Assurance) was seen as a *“really quite easy entry level position to get into”* (G6). In contrast, other roles, such as games

design, were *“pretty rare”* and *“hard to find”* (G6). Previous experience and skills were highly valued by recruiters. Certain roles such as *“artists and animators and even level designers”* (G2) were recruited on the strength of a *“show real or the portfolio”* (G2). However, this experience did not have to be with a DCI organisation. Experience could arise from tinkering at home and building websites.

For other participants, gaining access into the DCI involved serendipity. As one participant reflected, *“I didn’t mean to get into games”* (G7). Ambiguity surrounding roles and career paths in the DCI appear to lead to the situation where *“people kinda fall over their careers”* (S3). For example, one participant recounted that while working in a coffee shop, she befriended the male workers from a local games company who came in for coffee: *“I became quite good friends with them”* (G2). She had formed a strong social relationship, even having dinners with them, before she considered a job at the organisation. It was her exposure to these workers that led to her interest in the industry. She noted that while serving them in the coffee shop, she would *“hear a lot about what they were up to... how work was going, what kind of hours they were working, all the social kind of things...they always seemed to really enjoy what they were doing”* (G2). Another participant, an AI programmer, described her ‘luck’ in securing her first job when the organisation took the bold step to *“cast a wider net than usual”* (G3) and hired her as a junior, when they *“very rarely hire junior positions”*. In addition, she noted: *“I was lucky that the company I applied at was umm very blind to my gender because I know they’re not all like that”* (G3). Had there been no opportunity for exposure to the industry or entry level positions, these participants felt they would not have entered a career in the DCI.

Recruitment practices influenced participants’ access into the industry. Few of the women had applied for their positions through direct application. Indeed, some suggested that they had faced many rejections following that process. One participant who spent a period of time assisting the HR person in her organisation noted the discrepancy: *“All the time heaps and heaps of emails and cv’s in the mail for games testers, one female applies and there are hundreds and hundreds of guys everyday... the whole time I was there, one female”* (G5). Another female participant described the difficulty she had in recruiting females even when she *“purposely looked for females... I didn’t get any applicants a lot of the time...Or if I did they were too junior...when I did get them... it’s probably one in 10 is female”* (G8). Secondary sources of data support the fact that there are few women applying for specific roles such as programming: “We need better ways of involving more women[...] this is difficult when 99 of 100 programmer resumes received are from men” (Appendix 17, Item 28, M, 31, White, disabled, Uni, USA). However, this contrasts with the preferred recruitment channels identified by

games organisations internationally: Direct application (100%), industry websites (78%), networking events (56%) and use of recruitment firms (44%) (Appendix 17, Item 54). One participant who worked in the public sector viewed the written application process as leading to an “*equal*” number of “*male and female*” staff (M7). Similarly, another participant suggested women performed better in responding to the detailed written selection criteria required of applicants and men were better at “*talking or selling themselves*” in an interview (M7).

The manner in which job advertisements are presented may influence women’s entry into the industry. One employer identified that his staff had reasonably equitable numbers between genders: “*For the last ten years I’ve always had out of a crew of between 5 to 15, 1/3 to 1/2 women- in technical roles*” (S3). However, the interview revealed that particular recruitment practices were being used by the employer to recruit females. The employer described that if he advertised with an emphasis on production or management skills, he could be assured he would have a majority of female applicants. If he advertised for technical skills, it would be a majority of males applying. He believed women were making the decision to pursue non-technical roles before applying: “*They’re making the decision before they come here...that there are better career opportunities and more ummm control over their lives...or whatever I’m not really sure what drives the decision but to apply for project related roles as opposed to programming roles.*” (S3)

Access to networks could foster entry into the industry. One participant noted, in reference to securing her position: “*I didn’t even really look. Just [friend’s name] is my friend at [organisation] and I guess [organisation] told her they were looking for someone and then my friend told me*” (M7). Indeed, for several participants and stakeholders, networks appeared to be the preferred method of recruitment: “*I think I found that later in my career that I got all my work and jobs through word of mouth, but in the beginning you don’t have that so I didn’t get offered any jobs.... it was all word of mouth, never advertised*” (G8). However, as a male freelancer notes, these networks were often comprised of males and, thus, career opportunities involve networking with males: “*Jobs for mates and that sort of thing, so it’s a bit of a boys club*” (S1).

3) JUST LIKE TV

The third event, ‘Just Like TV’, recognises events that perpetuate inaccurate perceptions of both the DCI and women. Participants recalled how inaccurate information perpetuated by the media (television, newspapers, and websites) resulted in women not being interested in DCI occupational roles: “*And so you have to really scrape all the crap off and sort of see and find out who these people are and it would be a good boost, a good PR exercise for the industry*” (M5). *People need to sort of dig a little bit*

deeper, like go beyond the press release before they start believing how viable a particular career path is (S1). Participants emphasised the need for an accurate portrayal of women working in the industry. *It's about representing the industry in a way people are going to relate to it* (M9).

Participants identified the specific need for industry or education professionals to talk to school-aged children to inform them of career choices: *"that's when you go into schools and actually talk to them about what it is"* (M7). This information was needed to assess a fit between roles and personality: *"I think it's a matter of letting the girl know that these are all the different jobs you can have, which one suits your personality, which one's going to be the most rewarding as a career"* (G5). Many stereotypes perpetuated by the media, such as Maths being boring, were inaccurate:

When you're at school you don't know...you thought that the kind of mind that you needed or the kind of brain was more like a maths-y brain or something and you're like, I couldn't possibly, it's not me, it's a bit boring. But if you took it one step further and looked at the course details and chatted to someone, you'd probably get a different spin on what these jobs are like. (M9)

Stakeholders also emphasised the need for accurate industry information to be provided at a time when girls may be formulating career aspirations:

The one thing I'd like to see at happen at the university level or high school level is to get the message across that the interactive industry is a part of the communication industry and it's an interesting variation...It kinda needs to happen somewhere before the education system, somewhere between high school and sort of the higher education system. (S3)

4) LADIES LUNCHESES

The fourth event, 'Ladies' Lunches', recognises events that can make an individual feel isolated as a result of being different to their colleagues and peers. Participants described feeling different, lonely, and isolated as a consequence of being in the gendered minority in workplace and education settings. Women in one games production organisation (Organisation B, see Table 23) responded by organising a social event that facilitated their professional collaboration and fostered personal connection with other workers. The event, 'Ladies' Lunches', was a regular lunchtime meeting, to which female staff and even colleagues' wives were invited. In addition, several women had actively pursued social events as a way to combat the sense of isolation that developed from their being in the gendered minority. These social events were also seen as an integral way to develop contacts and skills: *"At my first job I always went to lunch with the guys for the first year at least because I knew they talked about work at lunch*

and I knew I needed that experience" (G3). Other ways of coping with a sense of isolation included signing up to online communities.

The female programmer (who worked in a multimedia organisation) reflected that she also felt lonely when she was a university student, as there were few women in her IT degree. Secondary sources also support the finding that women are a minority in some university IT programs, with an online website capturing this comment: "Put some compulsory IT classes in all degrees for chicks, it's getting a bit lonely in the IT lectures" (See Appendix 17; Item 42). However, she noted her loneliness was minimised during her undergraduate degree because the IT classes included those female students from other degrees that were picking up IT subjects. It was only when she was in her Masters of IT course (and the only female in the class) that she felt as though she was in the minority. She recollected that, on the first day, the male students made a joke about her arriving late; they had thought there would be no women in their class. However, she did not feel that the learning environment was difficult—primarily because she was only expected to interact with the students for a couple of hours at a time; however, *"if that was going to happen every day then it might be a different issue"* (M3).

Later in life, this same participant found herself in a work environment where she was the only female of a team of about 10 programmers. However, she noted she did not feel isolated as she could mix freely with other females (mostly from the web design and coding team) over tea and lunch breaks. She noted that even though she didn't think it was a problem that she was the only female programmer, she suggested that was because of the nature of the company she worked with as it was a *"very close together company"*. The size (number of employees) of the organisation or department was important: *"If it's in a bigger company I think it may be a problem because every department just isolated and I will find out I am the only female sitting in a big room"* (M3).

5) MUFFINS AND MEN

The fifth event, 'Muffins and Men', recognises the events where gender stereotypes surface in workplace practices to influence participation. Earlier findings identify that women face stereotypes that create a sense of tension between their occupational and gendered identity.

One participant recounted a specific event where she interacted with her colleagues and managers within a games production organisation. The event had happened only the day before the interview and the participant appeared visibly upset. She described how it appeared that, because she was a woman, male colleagues in the QA department had assumed she would be responsible for the paperwork involved in a

particular project.⁷⁷ She suggested their attitude was *"can you deal with this, it's like yuck that's like girls stuff"* (G1). The participant recognised that the task was not her responsibility; however, in seeing that the task would not be completed if she didn't do it, she completed it with the help of another person (a male). In return for his assistance she gave him with a box of muffins. A complaint was made against her for not completing the paperwork on her own. When management became involved, she felt they supported her, but for the *"wrong reasons"* (G1). Rather than clarifying that the paperwork task was the responsibility of the QA department, management implied that, if it happened again, the participant could simply supply more muffins.

6) THE CATCH 22

The sixth event, 'The Catch 22' recognises events where gender stereotypes influence a women's capacity to negotiate within the workplace. Findings indicate that women may face difficulties in negotiating salaries or employment contracts due to gender-related stereotypes.

One participant described a work environment where she felt she knew as much as a male colleague in a comparable position, who was earning a *"lot more money"* than she was. When asked why she thought this was so, she replied: *"It's just one of those things, you think, I know at the end of the day you think 'how the hell', the worlds obviously you know, screwed"* (M2). The participant attributed pay inequity to the difficulties women faced when negotiating salaries and employment contracts. She was aware that the attitudes towards women often meant women did not negotiate as forcefully as men: *"I do firmly believe that women are more sheepish when it comes to salary and promotion and male bosses will take advantage of this if you let them"* (M2). She described how it was not unusual for males to approach salary negotiations with their employer with 'cockiness and bravado'; however, *"in society it's not accepted for women to be that way"* (M2). She identified that even she would feel uncomfortable if a woman acted in a similar 'cocky' fashion to a male. Her response in that situation would be *"what the!"* However, discursively, she noted she was in a *"catch 22"* situation: she wanted an equitable salary but felt constrained when it came to negotiating it because of social norms and stereotypes surrounding the female identity. She recalled how she was *"totally freaking out"* when she heard of AWAs being proposed, mostly because the AWAs leave workplace negotiation in the hands of the individual, in comparison to the

⁷⁷ As an aside, the participant has since left the company, although it is not evident why.

provisions of workplace agreements or union-based awards.⁷⁸ *"I could of died when the gov brought in AWA's - cause most females are not good at negotiating"* (M2).

Secondary sources, such as the *Queensland Pay Equity: Time to Act* (2007) inquiry recognise the influence of inequitable remuneration and suggest that females on awards earn more than males on awards (Submission 58). Similarly, ABS surveys also indicate that women can be paid lower wages in the ICT Industry (See Appendix 17 Item 36).⁷⁹ As of July 2012, the ABS surveys do not provide pay equity data by gender for the DCI. Compounding the difficulties in negotiating salaries is the ambiguity surrounding them (as previously noted). Difficulties were amplified in organisations where there was a culture of secrecy surrounding remuneration:

I didn't like was the sense of secrecy about the wages [...] it was just very secret hush, hush business and I really felt that deteriorate the moral and then once that goes it's like you all become whinging bitches basically.(M2)

The need for self-confidence was an important aspect of negotiations. Another female acknowledged that she may have secured a management position with a prestigious games development organisation because *"I probably blagged it in the interview"* (G8). As an employer, she recognised that *"guys definitely talk themselves up a lot more"*:

Certainly, in the technological aspects they will talk themselves up. Girls will be more truthful. I think you come to really see through all of that bullshit as well - you hope. But the guys definitely, yeah, promote themselves more. (G8)

Secondary sources of data also indicate that women need to promote their value to their organisation. An email from an IT industry group states women should "be prepared to explain [their] value" (Appendix 17, Item 12). Similarly, an email from an industry organisation *Women in IT* in the UK (Appendix 17, Item 17) promotes a training event to teach women how to negotiate and be 'confident'. Another email from a LinkedIn group, states "it's necessary for women to negotiate successfully now more than ever" (Appendix 17, Item 35).

7) MIND YOUR MANNERS

The seventh event, 'Mind Your Manners', recognises events where gender stereotypes influence a women's professional identity. Findings indicate that when women face gender stereotypes this can trigger a lowering of 'confidence' in their technical ability.

⁷⁸ Australian Workplace Agreements (AWAs) were formalised individual agreements negotiated between the employer and employee. They were introduced in 2006; however, new AWAs were banned under the Fair Work Act, 2009.

⁷⁹ Quarterly Average Weekly Earnings (AWE)⁷⁹, the annual Employee Earnings, Benefits and Trade Union Membership (EEBTUM),⁷⁹ and the biennial Employee Earnings and Hours (ETHE)⁷⁹ surveys; AWE and ETHE are surveys of employers, while EEBTUM is a survey of employees.

Three participants recounted the event of being exposed to swearing. One participant in the games industry described feeling awkward in her *“immediate sphere of daily life”* when her male colleagues seemed to restrain from swearing in front of her, apologizing if they accidentally did so. She felt frustrated that even after *“being together for so many years”* and *“feeling comfortable working”* the apology came because she was *“one of the only women they see in their day”*. Insightfully, the participant suggested her male colleague’s action was not malicious. However, she described how her colleague’s actions triggered her own gender stereotypes, making her feel like a ‘girl’. She wondered: *“What else did they think...how else did they modify their behaviour around her...are they doing other things to accommodate this woman in their presence ...and how far does it go... the way they consider the women in our company”* (G2). She emphasised that this was a minor event, which she only thought of when she was *“racking my brain to try to think of a negative”*.

Another participant identified that the language her male colleagues used, or refrained from using, could make her feel awkward: *“Like if they watch their swearing around me that just feels weird to me that their treating me differently that they just assumed I'd be offended”* (M6). Another identified that she is *“occasionally frustrated by guys who feel they need to adjust their behaviour”* around the women at work, and gave a specific example of male colleagues restraining from swearing in her presence: *“It has the effect of patronising the females and seems like quite archaic behaviour and leaves me less comfortable to know that on some level I'm not considered to be a complete social equal”* (G2). Similarly, another noted that such practices could influence interactions with colleagues and her sense of fitting in:

Where a women who would take offence to a swear word probably would make people here feel prohibitive how they could interact with each other. Because boys, when there's a group of boys, tend to be like you 'bloody -----' and I think if they couldn't interact with each other in that natural way because there's a women present suddenly that would introduce gender problems. Whereas most of the women that work here are kind of tom boys including me so the guys can interact in the way that is culturally done in a games company. (G4)

The women did not suggest that swearing offended their professional identity. Rather, the concern lay in the fact that when males refrained from swearing, and treated the women differently, the gender aspect arose for the women. Participants did not want to feel different to their peers or make their peers feel uncomfortable: *“Although I said that it annoys me that the humour is quite juvenile at times I also wouldn't want them to like change it in front of me, feel uncomfortable around me”* (G3). When such practices reminded the participants they were a ‘girl’, their professional confidence faltered.

Maintaining a confidence in their ability, and peer acknowledgment of their skills, was

seen as an important way to remain feeling professionally valued in the collective. One participant noted that although her technical ability was intrinsically “*gratifying*”, she felt it was important for her to “*prove*” her technical credibility to her male colleagues. Here, the emphasis was on being firstly perceived as a valued, skilled member of the team and then she could add: “*as a by-line ‘and I’m a girl!’*” (G2). When asked how establishing her technical proficiency had an influence, she noted that it made the males “*more comfortable in an environment where slowly bit by bit more females are starting to join the industry*” (G2).

8) ARE YOU THE ENTERTAINMENT?

The eighth event, ‘Are You The Entertainment’, recognises those events that foster unprofessional male-orientated industry practises. Findings indicate that industry practices may promote women as entertainment, rather than as skilled professionals. This was evident in the types of entertainment provided at industry events, which could be interpreted as being orientated towards males. As one male stakeholder himself observed at a games conference held in Brisbane, the after dinner entertainment comprised of a female dance troupe:

Sony...funded that event. But the only girls who were there other than – I can remember like two or three actual women who were partners of the people involved there. All the girls who were there were actually paid to be there by Sony and they came out and did their little performances and stuff. But I think they’re only paid to be there until 12 or one and as soon as it hit that time there was no females at all. (S1)

Secondary sources support the evidence that women are often employed as the entertainment at technology-related industry events; for example, ‘Booth Babes’ at the international E3 games conferences (Appendix 17, Item 7), and the meter maids at the *Microsoft-supported Australian 2010 Tech Ed Conference* (Appendix 17, Item 40). These practices have been questioned by those in the industry and the wider society: “Need more women in the industry, and in order to do so will need to eliminate ‘boys only’ practices such as Booth Bimbos” (Appendix 17, Item 28, F, 22, White, HS, Canada). Backlash led to public apologies by Microsoft who stated that “the use of Meter Maids was decidedly inappropriate” (See Appendix 17, Item 40). ‘Booth babes’ at the US-based Electronic Entertainment Expo were banned in 2006 (Adams, 2006). Even initiatives that aim to foster women’s involvement in IT, such as the ‘Screen Goddess’ calendar (See 6.4.2 for further details), have faced public criticism regarding the appropriateness of the images, with the Australian Computer Society withdrawing its support for this initiative (Appendix 17, Item 16). Such male-orientated practices could alienate women in the work environment. A participant recounted how she was never invited to the after-work visits to strip clubs when her ‘team’ and US-based publishers

socialised: *"They just do things socially that I don't get invited to"* (G3). This was seen as constraining her career progression, as her male colleagues could establish a *"rapport that I don't have with the publishers"* (G3).

9) GREENER PASTURES

The ninth event, 'Greener Pastures', recognises events that constrain women's career progression. Constraints manifest because of the industry's general lack of well-defined career pathways and opportunities for progression, gender stereotypes regarding women's occupational strengths, and the value of certain occupational roles.

One stakeholder, an employer (and industry representative) acknowledged that workers (both men and women) faced difficulties formulating career pathways because the industry offered unclear career pathways. It was a *"challenge to articulate it [career pathways] even in our own organisation, let alone at an industry level"*, and there appears to be no *"clear understanding of tried and tested career path ways"* (S3). Both men and women face limited opportunities for promotion in technical roles. Games, in particular, could be *"an industry where...there seems to be very limited sort of areas for you to progress in being male or female"* (G7). Often, career progression entailed moving into management roles, rather than furthering one's technical role:

The longer you stay, the more narrower your career path becomes...you either become a senior programmer or a technical director. But there's not usually more than one technical director in an organisation, whereas there may be 5 or 6 programmers or otherwise you've got to specialise in Iphone development or something like that. (S3)

The stakeholder suggested that career opportunities surrounding certain technical roles may not be appealing to women:

One of the best Flash developers we've recently had umm is a female and she has, almost as quickly as she came, graduated beyond that role of as a technical person towards a project management lead. And I say graduated because to me... it's actually, the reason why a lot of guys are Flash developers, technical people [...] To be perfectly honest I'd prefer to be a female going through that role because you actually get more career opportunity whereas the guys tend to get stuck in fact that they've got to keep their hands on the tools. Whereas umm the girls I've seen come through are quite happy to let that go and move onto greener pastures... (S3)

Several participants suggested they would like to have more control over their careers and life/work balance. For many, this entailed owning their own studio in the future, because *"if you have your own gig you can make the rules"* (G3). The employer attributed the unappealing nature of technical roles, in most part, to the lack of control over work tasks, the project outcomes, and to life/work balance in general.

Technical expertise to me and I think in the industry is largely a task where people are told what they need to do ... so to have your women in technical roles will give them less influence on the outcomes of the project" ... "you get to that point in your life where you really feel like you need more control over your life therefore you feel like you need more control over my job. If I'm going to have more control over my job I need to be become more senior... (S3)

Although women entered the DCI in low level or junior roles (for example, QA assistant, production coordinator, or technical coordinator), they quickly progressed to more senior project management roles. An employer noted that *"in some respects to be perfectly honest I see women doing better out of the arrangement as it is"* (S3). Specifically, the employer appeared to place a lower value on certain roles or skills, such as Flash development. Secondary data suggests women may be pursuing higher paid roles that are non-technical (Appendix 17, Item 48):

To be perfectly honest, if I've got a guy here at 65 grand as a Flash developer and he's approaching thirty years old he's at the top of his pay range. He's not going to get much more he's just going to get older. If I've got women here who are 22, 23 on 65 grand who are at the bottom of their earnings potential they're only going up. And it's because they've chosen...it's where the ceiling lies. The industry pumps out Flash developers, junior Flash developers all the time. I can keep replacing those guys but the critical thinking that adds value to the organisation usually comes from girls. (S3)

10) MOTHERHOOD

The tenth event, 'Motherhood', recognises that women encounter constraints due to their parental responsibilities. Findings indicate that the industry does not foster family-friendly practices.

Although only two participants in the study had children, almost every woman interviewed mentioned that having a child would present challenges. The event of becoming a mother was seen as being so significant that several participants suggested that their careers would end: *"I imagine that it would pretty much come to a halt if I did decide [to have a child]"* (G6). Those participants who suggested that they would not consider stopping work had few strategies for coping in the situation. The AI programmer indicated that it might be easier to work in another industry. However, she also noted that the skills she had developed would not transfer easily: *"I've specialised a lot and I've learnt a lot of specific things that I can't apply now"* (G3). Participants indicated that they had concerns for their future participation. For those that had children, becoming a mother presented the participants with challenge and changes. A games worker, with a young baby noted: *"It's a bit of a social change. It's a bit of a financial change; all sorts of changes"* (G7).

Certain occupational roles were seen as being less compatible with becoming a mother. Management roles were seen by one participant and one employer as offering women greater flexibility and control over their lives than the technical roles:

when you think about the future [...] when I have a family, there's no way in the world [you'll] work in the private sector, no way in the world. You know, that's unless you're maybe in a management position where you have a bit more flexibility. (M7)

However, this contrasts with another participant who had secured a high level, permanent executive role in a multinational organisation. She stated that she couldn't *"imagine having a family in that role"* (G8) and that it might be easier for women in technical roles. Thus, both technical and management roles were perceived as presenting women with challenges.

Several women suggested that they would undertake a part-time work pattern when they became a mother, in order to achieve 'life/work balance': *"I think my profession is actually quite women friendly...I don't have to sacrifice my career, I can work around it. I can do more freelance art, I can do part-time"* (M1). However, for most of the women, part-time employment did not seem to be an option: *"We don't really have anyone working part-time. We have casuals and we have fulltime people. We don't have part-time people"* (M8). Some participants identified that part-time work would not be an option with their occupational role: *"I'd love to do that but try telling a games company that you're only going to work four days a week"* (G3). The games programmer noted that in *"My specific role I'm not sure, on this game, on this type of role but if I expanded into a different role and had a really good relationship with the games company"* (G3).

Similarly, a production assistant in the games industry did not consider her role as compatible with part-time employment:

I think being probably an asset manager and just having that role umm I could do it part time, I think being a prop builder, or an animator it would be quite easy because you get your set task and you know that is where it starts and this is where it finishes this is what it's meant to look like this is what it's meant to do it's sort of black and white. Whereas what I'm doing it's ... you know I need to be around. (G1)

Several women expressed a need for information regarding their options when they became pregnant. However, it appeared that workplaces offered ambiguous information. For example, in one work place, two participants had different perceptions of maternity leave options. One participant said that although the company was *"fantastic with paternity leave but there's no such thing as maternity leave...I'm pretty sure I'll be one of the first ones to get maternity leave"* (G1). This participant appeared to base her concerns on a previous event she had observed where a woman in a similar role, and (interestingly) who also had a partner working at the same company, had been working part time until about four months into the pregnancy and *"then just disappeared, she*

was just gone". The other participant believed the company was supportive of new mothers, even if the industry or actual work conditions were not: *"[Organisation name] in particular is accommodating of new mothers...it's maybe...long hours, the staring at a computer screen for hours on end. Maybe that's not the most appealing prospect for a mother to be"* (G2).

The women employed in the public organisations stated their organisations were more supportive of parenthood, particularly as they offered clear policies and procedures regarding parental leave: *"I think they do really make an effort to be supportive of people and with families and sort of talking about families"* (M8). Across the private organisations, women felt as though there were few supports for them if they became parents: *"There's nothing there if I did decide to have a baby"* (G1). This often manifested because of the organisation not having had experience with maternity leave due to the male majority. Another participant identified that she did not believe her company would provide *"any kind of maternity pay or anything like that. And you know they probably don't have to because they're all men working in the industry"* (G6). The following comment, from a participant working in a local studio of a large multinational games company, shows how DCI companies may not be prepared for issues surrounding female employees becoming mothers:

At the time I fell pregnant there were 90 to 100 staff members and there were six women and four of them worked in the actual art realm...design. When I fell pregnant I told my boss and my boss doesn't have children and he was a little like, oh, I don't know how to deal with this. (G7)

The distinct lack of female role models in the industry, particularly those who were mothers, was seen as an influence. Participants identified the need to talk to someone who had experience in balancing work and family: *"I'd want to talk to other people who've sort of been theret"* (M8). Thus, perceptions of incompatibility between motherhood and career appear not to be based on direct experience (as many did not have children or know of women who did), but rather on vicarious experience, where the women had observed the impact of industry demands on their male colleagues who were trying to manage their family commitments:

In this industry, I would be concerned about having a family just because seeing the guys at work who are just there all the time and I know they've got babies at home that they should be spending time with, and they don't have the opportunity because we're on deadlines. (G3)

There was a suggestion that colleagues would treat you differently if you had a child. For example, those with parental responsibilities may be *"treated with leniency or you do what you can"* (G2). A participant recounted how, in other industries, she had observed women trying to downplay their parenting responsibilities. She saw the

weakness of the ‘power-suited’ women as being that they tried to be ‘too strong’:

“Obviously I didn’t have kids then, but when I think back to how they were, these women in those industries, they didn’t do it. Oh no, no, like we’re proving a point, we are the woman, we are stronger” (G7). In contrast, she observed that there was little stigma surrounding men’s family responsibilities: *“When these guys go home because their wife is sick and they’re going to go home and look after the kid, no one cares” (G7).*

Secondary sources indicate that employers may be less willing to hire a woman than a man because of the perception that she will take leave of absence from work. An interviewee in a leading industry-related magazine replied to the question “Do you feel that you have ever been held back because of your gender?” in the following manner: “I think that many employers are just afraid women will become baby factories and end up out of the office more than in” (Appendix 17, Item 52). The two women, who had children, employed a variety of actions to foster their ongoing career participation. Both emphasised that they actively maintained their skills whilst on maternity leave by ensuring they had resources such as software at home:

I mean I’d pop in every couple of months and go, shit, look at what they’re doing. I don’t know if I can do that. So the first thing is I would have to go home and practice. ... for the first few weeks of my maternity leave, I was actually working from home part time – maybe 15 hours a week. It wasn’t a huge amount but I was doing it. (G7)

However, there were issues with the practicality of working from home. One participant described her living situation and how, when she worked from home, her child kept touching the computer equipment: *“It can’t be used for work anymore because my little boy is constantly just drawn to it and he yanks it and pulls it and it’s a big toy. So unfortunately it (trying work from home] doesn’t work at all, not when he’s there” (G7).* Both of the participants who had children described the challenges of being a working mother. However, the DCI was seen as a ‘good industry for women’:

It is a good industry for women. It really is a good industry for women; maybe not the average woman who wants to wear the power-suit thing and like produce four kids but be really good at her job and a great multi-tasker, but it lends well to I think having a family. (G7)

However, the same participant flagged her concerns about being able to continue in her role if she wanted a second child:

I remember this very well – I was in a meeting and I’d just got back from maternity leave and my boss said to me it’s so exciting having you back and [...] now you’re a senior a lot more is expected. And I sat there and I thought, yeah, no, I mean I love challenge, I’ll do it. But the one thing that I actually thought was you know what if I wanted another child, there’s no way I could stay in this industry, and that’s not to do with my company in particular, that’s just the industry at large. (G9)

Participants recognised that historical practices surrounding family and work are changing. For the most part, these changes are a consequence of the male majority getting older and having family responsibilities: *“I mean the industry is definitely growing up. It’s evolving. So a lot of the guys that I deal with, their wives are having babies”* (G7); and *“Like here a lot of the guys are parents so umm I think ---the age of the industry-- they’ll be more and more and they’ll start figuring out what they’re going to do about those sorts of things”* (G3). However, this aging workforce is potentially replaceable with the next wave of young workers.

The whole creative industry is definitely getting younger [...] – these kids who are brilliant... a lot of them don’t have a lot of like major family pressures or they will work an extra 24 hours a week if they have to because they can. (G7)

5.2.4 REFINEMENT OF FRAMEWORK 1

The initial guiding categories offered by Framework 1 of Environment (E), Person (P), and Interaction (I) between the E and P, have been refined through the analysis of the empirical data. This refinement led to the development of two models: 1) the *Sphere of Influence (SoI)* model, and 2) the *Events of Interaction (EoI)* model. The *SoI* is comprised of the E and P categories, where E is comprised of the four dimensions of the environment (social, cultural, mediated, and resource-related, as described in Section 5.2.1), and the P category which is comprised of one dimension—social identity (as described in Section 5.2.2). The *EoI* helps describe the ‘I’ category by highlighting 10 events of interaction between the E and P (as described in Section 5.2.3). **These two models, the *SoI* and the *EoI*, are contributions emerging from this research.** The two models are discussed in detail in the following chapter.

5.3 FRAMEWORK 2: THEORETICAL (HUMAN AGENCY MTS)

Chapter 3 proposed that a theoretical framework comprised of a *Human Agency Multi-Theory Scaffold* (the *HAMTS*) could help guide data analysis. The *HAMTS* provides 11 concepts for data analysis (as presented in Table 41). Findings indicate that all of the concepts were evident in the empirical data to some extent; some more readily than others. The concepts both helped identify influences and fostered a deeper understanding of influences. A full discussion of the value of the *HAMTS* in particular, and the value of a *MTS* in general, is offered in the following chapter (See Section 6.2.5).

Table 41 Concepts from the Human Agency Multi-Theory Scaffold (*HAMTS*)

Theory from Human Agency <i>MTS</i>	Agency theory concepts used in analysis of empirical data
Meta-Theory: Structuration Theory (Giddens, 1984)	Modalities 1. Interpretive scheme 2. Facility 3. Norm
Critical Theory: Social Theory of Gender Theory (Connell, 1987)	4. Power
Middle-range Theory: Social Cognitive Theory (Bandura, 1986, 1997, 1989b, 2001)	Environment mechanisms 5. Vicarious observation 6. Feedback and reinforcement 7. Scaffolding Individual mechanisms Self-efficacy 8. Outcome expectations 9. Disposition 10. Self-reflectivity
Operationalised: Social Cognitive Career Theory (Lent et al., 1994)	11. Self-efficacy

5.3.1 META-THEORY: STRUCTURATION THEORY (ST)

Three concepts from Giddens' (1984) stratification model of action (a component of *Structuration Theory*) were used to re-analyse the empirical data: 1) interpretive scheme, 2) facility, and 3) norms (as illustrated in Table 41). These three modalities connect the individual's actions (communication, power, and sanctioning of conduct) to the societal structure (signification, domination, and legitimation). Data analysis sought to identify if the three modalities were evident in the empirical data, or could be used to explain the data. Table 42 presents examples of matches between the empirical data and the modalities. Following are several further examples of how modalities can help explain the influences on women's participation.

Table 42 Empirical evidence of Giddens' concept of modalities

ST modality	An example in the empirical evidence
1 Interpretive Scheme	The modality suggests that stereotypes are communicated in the media or in person and signify their capacity to the person. In the empirical data, participants' comments that " <i>if everyone says</i> " that women are not capable (M3) are suggestive of there being what Giddens calls 'common stocks of knowledge'.
2 Facility	The modality suggests that access to resources is influenced by power relationships. In the empirical data, participants' comments suggested that access to software could empower an individual; however, many of these resources were targeted towards males.
3 Norms	The modality suggests that women face social norms that they are expected to follow. In the empirical data, participants' comments suggested that they recognised norms such as " <i>It's not expected that the girls are as interested in games as the guys</i> " (G2).

1. INTERPRETIVE SCHEME

Aspects of the empirical evidence can be explained using Giddens' modality of 'Interpretive scheme' (Communication < Interpretive scheme > Signification). The Interpretive modality draws attention to structures of "signification" (language and other symbolic codes) to produce/reproduce "communication" (meaningful and understandable interactions) (Giddens, 1979, 1984). There was evidence that the empirical data (participants' accounts and secondary data) can be understood by drawing on Giddens concept of 'Interpretive scheme'. There were two specific examples: 1) the signification of women's stereotypical capacities presented in books and on the internet, and 2) the non-signification of gender through clothing in the workplace.

1) Participants made statements in reference to stereotypes surrounding women's proficiency with technology: *"If everyone tells you the same thing then you will think that is the truth"* (M3). These statements were interpreted by the researcher as representing participants' awareness of what Giddens (1984) referred to as 'common or symbolic knowledge'. One participant suggested that stereotypes presented by mediums such as books—particularly the title *'Why women can't read maps'* (Pease & Pease, 1998) – perpetuate the notion of women's limitations in working with technology.

Secondary evidence also suggests that resources within the environment may signify they are not intended for women. For example, software on the internet is presented alongside links to live sex shows and porn (See Appendix 17, Item 20). Giddens (1984) proposed that shared stocks of knowledge, communicated through language and symbolic artefacts (for example, books), can signify to an individual their capacity. Books and the internet are examples of these 'shared stocks of knowledge', where sexist material can signify to women certain social beliefs about their capacity to work with technology.

2) A further empirical example of signification occurs in the clothing typically worn by workers in the DCI; this is casual attire, such as *"super daggy, jeans and t-shirt"* (S1). The male freelancer (S1) noted that the casualness of the workplace attire contrasts with that of corporate workplace environments: *"The image thing in terms of a corporate workplace environment isn't there"* (S1). The freelancer also noted that clothing does not signify capability in the DCI workplace: *"It doesn't matter what you look like or what you're wearing. You do what you do and you're rewarded for the product that you make and if you can make a game that's successful"*. Similarly, a female participants viewed casual workplace attire as being a positive characteristic of the environment because it minimised the gender stereotypes she experienced. As the DCI industry allowed

workers to wear whatever they wanted, this meant that you could *“be comfortable all day and you can express yourself”*. She continued: *“I can’t imagine working somewhere where you’re expected to wear a skirt, here you can just be yourself all the time and not worry about being something different”* (G3). Casual attire did not ‘signify’ a person’s gender and, consequently, women felt that they faced fewer gender stereotypes. Participants linked the wearing of clothing typically associated with women (for example, skirts) to somehow constraining their individual capabilities, because it signalled their gender and the stereotypes linked to that gender: *“If I didn’t understand something I felt it was because I was wearing a skirt”* (M4). Giddens (1993) noted that gender identification manifests through clothing and gives an example for the education context, where “regulations that compel girls to wear dresses or skirts in school form one of the most obvious ways in which gender typing occurs” (p. 43). Thus, Giddens’ modality of ‘Interpretative Scheme’ helps foster an understanding of influences on women’s participation.

2. FACILITY

Aspects of the empirical evidence can be explained using Giddens’ modality of ‘Facility’ (Power<Facility>Domination). The Facility modality draws attention to the person’s capability to exercise power at the level of concrete practice by accessing domination structures, which include allocative or authoritative resources (Giddens, 1979, 1984). There was evidence that the empirical data (participants’ accounts and secondary data) can be understood by drawing on Giddens concept of ‘Facility’.

Although power was not mentioned to any great extent by the female DCI workers, the researcher deduced three specific examples where power could be at play: 1) the exclusion of women by men in workplace settings (leading to a sense of powerlessness), 2) the physical layout of workplace settings (which can contribute to mitigating this exclusion), and 3) access to software and hardware resources (which can influence women’s participation).

Women described situations where it could be deduced that they felt less than empowered. For example, when male colleagues conducted work-related meetings in strip clubs, these practices left women feeling excluded because they felt denied access to information. In contrast, the physical layout of workplaces was seen as a positive aspect as it facilitated openness of communication. Giddens (1988) identified that physical settings are connected to power (pp.286-298). Participants did not identify resources as being associated with power. However, they did note that access to resources—such as industry websites, magazines, computers and mentors was an important influence because it gave them access to information. For Giddens, access to

resources is an aspect of power. Resources such as magazines, computers and software may be considered as examples of what Giddens (1984) referred to as ‘allocative resources’, and a mentor as an example of ‘authoritative resources’.⁸⁰ Thus, Giddens’ modality of ‘Facility’ helps foster an understanding of influences on women’s participation.

3. NORMS

Aspects of the empirical evidence can be explained using Giddens’ modality of ‘Norm’ (Sanction<Norm>Legitimation). The Norm modality draws attention to how a person may sanction others by drawing on legitimation structures (moral orders associated with laws and religion) (Giddens, 1979, 1984). Findings suggest that women’s participation is influenced by social norms perpetuating inaccurate social stereotypes regarding women’s capacity for technology. In addition, women face sanctions if they transgress social norms.

Participants noted that the norms regarding women’s capacity for technology could limit their participation in the DCI. One participant notes: *“It’s not expected that the girls are as interested in games as the guys...I think it’s just a general assumption”* (G2). Women appeared to be aware of these social norms and faced the challenge of reconciling the norms against their own personal experiences: *“I think there was a barrier there in my head. You know programming is sort of seen as you know a boy’s thing ... I think there’s a message that comes down the chain that you know that girls just can’t do that stuff; you know they don’t have the mental capacity and all that sort of stuff”* (M5). Another participant noted that an absence of social norms fostered their participation: *“I felt comfortable interacting with guys at an early age ...perhaps I didn’t get conditioned that way to have separation between girls and boys because there weren’t any”* (G6). Another noted the role the individual plays in challenging those norms: *“Even if there’s a tendency, like if most women don’t like programming doesn’t mean that all women don’t. There’s a lot of factors that can add up to what they like. I like programming but I only know that because I got into it because I liked math”* (G3).

Participants noted the norms that suggested women were best suited to administrative and communication-based tasks in contrast to technical. The social norm was that: *“Women are better at certain things and men tend to be better at certain things”* (G2). Comments from a stakeholder also suggested there were norms regarding women’s capacities to work in certain occupational roles: *“It’s really around the kind of segregations around skills around organisation, and project management, and following*

⁸⁰ 1) Authoritative resources (which derive from the coordination of the activity of human agents and the capability to generate command over other people); and 2) Allocative resources (which stem from control of material products or aspects of the natural world, or the capabilities to generate command over material objects) (Giddens, 1984)

through and attention to detail that women excel in this organisation at. The obvious ones are communication..." (S3). However, the stakeholder's comments also suggested that people's actual experiences can dispel inaccurate gender stereotypes. In reference to the norm that women are better communicators he stated: *"But I think that's a bit a cliché the communication one [...] it's not to say that is always the case"* (S3).

Although one participant described feeling *"obligated"* to social norms (G2), others felt they could challenge certain norms surrounding occupational practices. For example, although there was an expectation that team members would work back late, several participants took the action of not doing so, as they believed it was not required. Any self-sanction, or sanction from colleagues, was minimised *"as long as you're getting the work done"* (M6):

... it's very easy to allow yourself to feel pushed into certain things. Like I turn up at 8 and leave at five and there's always people that are staying late. But if I finish my work I go and I think people tend to see everyone else and they feel bad and I think that's a part of what fosters this unhealthy work life balance is where people feel they have to even though they don't. (G4)

Women appeared to face sanctions if they transgressed gender-related norms. One participant identified that women may face some form of retribution from male colleagues if they did not act the way the norms suggested women should: *"It's a feeling, yeah, that I got just from the vibes I got"* from the *"guys"* that they *"don't like that strong female and I think that's not just multimedia. I think it comes in a lot of different areas where that strong female has an issue"* (M7). Women faced different social norms or 'rules' than men: *"I think the rules are a little bit different for women than for men"* (G4).

Thus, findings suggest that women face norms as a result of their gender and although women could challenge these norms, they risked facing sanctions for doing so. Thus, Giddens' modality of 'Norms' can help explain the empirical data and foster an understanding of influences on women's participation.

5.3.2 CRITICAL THEORY: SOCIAL THEORY OF GENDER (STG)

Empirical data was also re-analysed using Connell's (1987) *Social Theory of Gender (STG)*, with specific regard to his conceptualisation of power. However, there was limited evidence that the empirical data (participants' accounts and secondary data) could be understood by drawing on Connell's notion of power. Analysis revealed that power was not a concept often raised by participants as being an influence on their participation. Only two participants explicitly mentioned the term 'power' and this was in reference to difficulties they experienced when working with other women, rather than men. In contrast to Connell's critical theory, which draws attention to inherent power

relationships between men and women, one participant described the power play that occurred between women:

When you have two head strong women and there's that power play, you know power roles and I don't think women really negotiate power very well in general" ... "I think women sometimes have a disregard for each other's power because they want the same thing, OK, and they are not really willing to acquiesce to the other persons, umm you know position or authority. (M5)

However, power could be inferred from the data. For example, several participants highlighted that once they felt they had gained experiences and skills, they were in a stronger position to negotiate their salaries. One stakeholder made a direct reference to 'power' in reference to certain roles in the industry; for example, she saw programming as providing individuals with power: *"It's somewhere where you can find power. Programming is power"* (S2). She described that the PC (personal computer) is not only a toy, but a young male's *"world of strength"* (S2). She implied this was not often acknowledged: *"If they ever realised how powerful they could be. Well society would collapse and they'd run amok, wouldn't they?"* These findings suggest that it is a person's own sense of personal power, rather than power play between the genders, that is an influence on their participation.

5.3.3 MIDDLE-RANGE THEORY: SOCIAL COGNITIVE THEORY (SCT)

Data was further re-analysed using several concepts from Bandura's (1986) *Social Cognitive Theory (SCT)*. As Table 43 indicates, these concepts include the four inter-related cognitive mechanisms of the person: 1) self-efficacy, 2) outcome expectations, 3) disposition, and 4) self-reflectivity. Three further mechanisms that involve the environment were utilised and these were: 1) vicarious observation, 2) feedback and reinforcement, and 3) scaffolding. There were many instances of resonance between *SCT* concepts and the empirical data. Table 43 provides several examples of matches between the empirical data and the person mechanisms; these are then further detailed. Similarly, Table 44 presents several examples of matches between the empirical data and the environmental mechanisms.

Table 43 Empirical evidence of Bandura's person mechanisms

Person Mechanism	As evidenced in empirical data by participant quote
1 self-efficacy	<p>-<i>"Umm I think you have to have self-confidence I think that's the only way and have a goal"</i> (M4).</p> <p>-<i>"if you don't have the industry experience in a proper employment setting. It sort of eats into your professional confidence in your own personal ability and stuff"</i> (M5).</p> <p>-<i>"for me confidence came from experience"</i> (M4).</p>
2 outcome expectations	<p>-<i>"I like that it will get rated highly by the reviewers so I don't want to work on a cookie cutter whatever game that will just get thrown off the shelf"</i>(G3).</p> <p>-<i>"I do want to work on a game that I think is going to be fun and cool, and my little brother will like"</i> (G3).</p> <p>-<i>"I mean, yes, you could definitely do the job competently but would you find it rewarding, would you really want to be there"</i> (S1).</p>
3 disposition	<p>-<i>"I think it does attract a certain type of female sort of personality type"</i> (G6).</p> <p>- <i>"Going into an all women's class I thought I had a better chance of getting higher grades" ... "because I had always had to put up with guys who were 'always' better for whatever reason", "it's probably just an ego boost". I'm someone who doesn't like to fail"</i> (M2).</p>
4 self-reflectivity	<p>-<i>"...wow when you think about it that's interesting"</i> (G2).</p> <p>-<i>"Even though years after starting in the workplace retrospectively I can go, I was still really lacking confidence, it was building up... a lot of the experiences since working professionally have been really positive"</i> (M4).</p>

PERSON DRIVEN PROCESSES

1) SELF-EFFICACY

The findings suggest that a woman's developing sense of confidence or self-efficacy towards technology is integral to her participation. Although participants did not use the term 'self-efficacy', they often used the term 'confidence': *"They will succeed...if they have self-confidence"* (M4). 'Confidence' is interpreted here as a colloquial form of self-efficacy, as many of the references to confidence were in relation to skill development. Confidence does not necessarily specify what the strength of belief is about, whereas self-efficacy includes both an affirmation of a capability level and the strength of that belief (Bandura, 1997). Bandura (1986) defines self-efficacy as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 391).

The findings suggest that self-efficacy manifests when participants have the opportunity to develop skills that foster their ‘confidence’. As people practice and develop their mastery of a skill, they become more confident and have a belief in their ability and capacity. Several participants recounted how surprised they felt when they entered the workforce and realised *“it wasn’t as hard as they thought”*, and that *“they just picked it up”* (in reference to computing skills): *“This role has given me the chance to develop my skills further and embrace new professional opportunities that would not have been possible before. This has provided me with an enormous amount of personal satisfaction and confidence in my abilities”* (M5). Thus, participants’ confidence was linked to their experience: *“For me confidence came from experience”* (M4)...*“once you’ve got the experience it doesn’t matter, people want you, you’re very valuable”* (G5).

The findings also suggest that self-efficacy manifests over a lifespan perspective, where early childhood and education mastery experiences foster self-efficacy towards technology later in life. Ongoing mastery opportunities were required, particularly as *“technology moves very fast and it takes time to master every version of something that comes through”* (G8). This ongoing need to maintain skills was seen as both an enabling and a constraining influence by one participant. It was enabling as it provided her with a motivating challenge; however, it was also a constraint as it involved an ongoing commitment and effort to keep up with changing technology: *“In the early days I was really excited when a new version came out and I wanted to know everything that it did and I wanted to know all the little things that were going to happen. But after I did that a couple of times I thought, yeah, I’m not going to be doing this...”* (G8).

Having both the skills and confidence could influence interactions such as salary negotiations. One participant recounted that women wouldn’t ask for certain salaries (comparable to men’s) because *“they didn’t have the confidence to ask for it”*, whereas *“the guys have the confidence to tell the boss to fuck off”* (M2). This was an observation the participant made of *“Not only myself but most other girls”* who she *“knew had trouble getting the salary that they were worth. Not because they didn’t want it, but because they didn’t have the confidence to ask for it”* (M2).

Secondary sources further support the notion that ‘confidence’ is central to women’s successful participation in the industry. For example, several articles indicate that women may lack confidence. For example, Appendix 17, Item 11 reports that an American games industry panel suggests that “women don’t always recognise or even have confidence in their ability to be games designers”. Industry initiatives aim to help women increase their confidence. For example, an email from an industry group for women in IT in the UK asks: Do you lack confidence? If so, it offers workshops to address this (See Appendix 17, Item 17). Being in the gendered minority could diminish

women's confidence *"because you doubt yourself you know, naturally, you doubt your confidence because there aren't any other females in the industry that I can look up to"* (G5). Additionally, women were seen as not possessing this confidence; in part, because of not wanting to appear confrontational:

... that confidence is going to help a lot of people get jobs. A lot of women don't like direct confrontation [...] we're afraid of offending people a lot more and we're not so aggressive and I think that comes down to confidence as well and experience. (G5)

2) **OUTCOME EXPECTATION**

Bandura recognised that individuals have outcome expectations, where they may ask the question: 'If I do x, what will happen?' Outcome expectations are often driven by rewards (intrinsically or extrinsically driven), or perceived rewards. According to Bandura, such rewards include physical and monetary rewards, social approval, and self-satisfaction (Lent et al., 1994, p.83).

Participants identified that gaining skills offered an intrinsic reward, which then could serve as a further motivator: *"Once you start learning and getting results and you actually make a program you can get a reward to say wow this is fun, I want to make it more complex"* (G5). For some participants, outcome expectations involved perceived financial reward. One participant (who had a Computer Science degree) reflected that monetary reward had been a motivating factor for her choosing to pursue games development in contrast to other areas: *"I think that was probably my main deciding factor was all that hype about the money and I thought I'm going to get some money"*; there was that *"perception back then of being worth so much money"* (G3). Secondary sources of evidence, such as the Women in the IT Industry survey, also indicate that possible motivators may be money (Appendix 17, Item 41).

Other rewards that sustained participants' motivation included the ability to be creative. Some participants valued the creative rewards higher than the financial: *It's not an industry you make a lot of money in. It's about the artwork [...] for me it's about the game that I make[...]I'd love to go and work in Moldavia for 6 months for no money on one of these crazy titles that they're producing [...] they look fantastic.* (G7)

Where outcome expectations reflect a person's beliefs of what may happen, goals represent what an individual would like to do. One participant suggested that women may have clearer goals than men: *"I don't know if it's a general male or female thing but women seem to have more of a future sort of plan"* (G7). Participants' accounts suggested that they pursued situations where they could meet their goals: *"At school I wanted to get good marks so I always took the courses I would excel at and so in university I ended up with a computer science focus"* (G3). One particular participant described the 'safe' (M2) all girls education environment she experienced as a student as

having fostered her participation⁸¹. While she used the term ‘safe’, the participant did not feel threatened in any way, but wanted an environment where she could meet her goals: *“I guess my understanding of safe is more about achieving my goals not necessarily being petrified of the boys or anything like that”* (M2).

Women’s goals or outcome expectations could, however, be constrained by the industry characteristics and gender stereotypes that they face. This is exemplified in the practice of funnelling women towards administrative roles, which may not meet the individual’s needs in light of their skills and aptitude:

I want to see that I can progress and the women that I’ve met are slightly a little bit more career oriented, they like to see that they can progress, not necessarily in the, dare I say, administrative line. I mean you don’t want to study for X-amount of years to become the office manager. (G7)

3) DISPOSITION

In *Social Cognitive Theory (SCT)*, an individual’s disposition is a dynamic, multifaceted belief system and includes their reactivity, self-regulation, and response (coping strategies and attitude based on experience) (Bandura, 1999b). An individual’s disposition may mean that they respond differently to a situation or circumstance than others.

One participant described a situation where she and fellow female colleagues were bullied by a male manager. However, her individual response differed to that of one particular colleague: *“One of the managers there who was an outrageous bully, like just insane and I just started not tolerating it. Initially I used to get really upset and not really understanding what was going on”* (M4). She noted that the fellow worker had a *“nervous breakdown”* because of the stress and, consequently, left not only the organisation but the industry. In contrast, the participant responded differently; the negative conditions motivated her to pursue job opportunities elsewhere. This action led to her subsequent employment in a public organisation, which she perceived as providing better conditions. Thus, the individual differences amongst women may involve their unique dispositions.

4) SELF-REFLECTION

For Bandura (1986) the capability that is most “distinctly human” (p. 21) is that of self-reflection. Through reflective self-consciousness, people evaluate their motivation, value commitments, and maintain meaning of life pursuits (Bandura, 2003, p. 168). Findings indicate that participants were self-reflective towards their participation.

⁸¹ She was participating in a Diploma of Multimedia for Women (with an all-female student intake).

Participants' reflectivity can be interpreted from comments such as:
"Retrospectively I can go, oh, I was still really lacking confidence, it was building up"
(M4). One participant described a strategy she had actively employed to return to work after having her first child. The key requirement for her was to reduce work pressures and balance family life. She described how she 'took stock' when making the decision to delay pursuing working on Triple A titles that were seen as crucial to establishing her occupational credibility and job opportunities: *"So when he's a little bit older then I'll sort of hit some AAA-titles, so it's a good time to just sort of take stock"* (G7).

Other participants exhibited reflectivity during the interview. For example, when asked how many women worked at her organisation, one participant noted that they had thirty women, implying this was a healthy figure. When asked how many were in technical roles (in contrast to administrative) she identified *"under ten maybe 5 or 6"* (G2). It was the interview situation that made her consider this difference and she noted: *"Wow, when you think about it that's interesting"* (G2).

ENVIRONMENT DRIVEN PROCESSES

In addition to the four cognitive mechanisms that the person possesses, findings indicate that aspects of the participants' participation could be explained by three further mechanisms that Bandura identified. These mechanisms stem from the environment the individual is positioned within, rather than from the individual themselves. Accordingly, empirical data was coded for the following three mechanisms:

1. Reinforcement or feedback
2. Vicarious learning experience
3. Scaffolding of skills and knowledge

Table 44 provides an example of empirical data matching the environment mechanisms that Bandura's SCT draws attention to.

Table 44 Empirical evidence of Bandura's environmental mechanisms

Environmental mechanism		As evidenced in the data
1	Reinforcement or Feedback	- <i>"It wouldn't surprise me at all if it is more about how they are treated in the workplace whether like, lack of feedback"</i> (M2)
		- <i>"... she didn't like the criticism that she was getting and I think that's probably because the criticism, like that was all she was getting from the environment, just criticism and no positive feedback but no neutral feedback, no general chit chat, none of those"</i> (M8)
2	Vicarious experience	- <i>"There isn't an image of a hot female programmer out there that people want to emulate or aspire to"</i> (G10).
3	Mastery opportunities/ scaffolding of skills and knowledge	- <i>"I want to work with someone who's had more experience as well that I can learn from"</i> (M6). - <i>"Career opportunities arise from experience through this experience we seek out or given the opportunity to move onto something else and be mentored"</i> (G2).

1) REINFORCEMENT OR FEEDBACK

Bandura's *SCT* suggests that feedback can be received through 'verbal persuasion' from other people (Bussey & Bandura, 1999). Receiving feedback on performance accomplishments will improve a person's self-efficacy and help a person consider if their efforts and goals are feasible and realistic.

Participants identified that receiving feedback was a positive influence on their participation as it facilitated their sense of feeling valued as members of the industry and increased their confidence: *"Management say good things and that was an enormous umm [...] confidence booster, so yeh I kinda thought this is not so bad"* (M5). Feedback came from a number of sources, including employers, peers, and even clients. Employers could provide feedback, informally or formally, such as during a performance review: *"In my review I had a sense that I was being treated completely fairly and umm that I was being supported"* (G3). One participant thought back to her first day at the DCI organisation she was employed at, and described how a colleague was receiving praise for a presentation she had given: *"Just the support and congratulations, I don't know, I just thought that was like wow, whether it was true or not I don't care but they came out and said 'done good'".* She added: *"I want some of that"* (M2). Another participant described how a male colleague she had worked with previously recommended her for a job in the company he worked in. His recommendation seemed important for her self-confidence: *"For me that was sort of a bit of an achievement [...] I actually felt confident probably for the first time in my whole career that I could actually do this work"* (M5).

Another participant, whose role involves some Flash⁸² software programming, and who found programming fun, stated that *“women were not good at programming”* (M2). When asked if that was nature or nurture, her reply indicated a level of reflexivity about the influence of socialisation: *“I’m not sure, whether it’s just because everyone says that, then we grow up thinking that, so we sabotage ourselves”* (M2). Although she had used the word ‘we’, it is unclear to what point she was self-stereotyping, as previously she had identified herself as not being like other ‘girls’. Her comments suggested that social messages may reinforce inaccurate stereotypes regarding women’s capacity for technology-related careers. This is not dissimilar to Giddens’ modality of ‘Norms’, which recognises that individuals face sanctions from others.

2) VICARIOUS OBSERVATION

Bandura’s SCT suggests that learning from others through vicarious observation can foster the person’s cognitive mechanisms identified earlier. Learning from observation is enhanced when the people involved share similarities, such as gender (Bussey & Bandura, 1999); for example, female workers observing female role models.

Participants indicated that they learnt skills and social practices by observing other people; both in their immediate context and via mediated forms such as television. Participants utilised terms presented in Bandura’s theory, such as ‘role models’, to describe these people. A majority of the women interviewed, in both multimedia and games production, believed that the lack of suitable female role models was a key negative influence on women’s participation: *“I reckon there are some positive role models out there you kinda just have to sort of bump into them along the way. But there’s no real, like again it comes back to the public face”* (M5). Only one of the women interviewed could identify a female role model who was a working mother. There was a paucity of female role models who were programmers: *“I’ve only ever heard of one other female [programmer] and this is a story someone else was relaying to me about a country they used to live in”* (G2); and *“There isn’t an image of a hot female programmer out there that people want to emulate or aspire to”* (G4).

In contrast, several secondary sources indicate that there are role models, at least internationally. For example, the games industry website Gamasutra identifies the top 20 role models, and the Edge magazine lists the top 100 (Appendix 17, Item 23). Events such as the 2010 Women in Gaming Awards Luncheon (Appendix 17, Item 13) aim to recognize “the accomplishments of all women in an industry currently dominated by men”. However, although sponsored by well-known industry groups (in this case

⁸² Flash is a software package from Adobe that utilizes Actionscript. ActionScript is an ECMAScript-based programming language.

Microsoft), the event is described online as an ‘intimate’ event. This suggests that although role models exist, they may not be publicised widely.

There are also few resources which promote female DCI role models in Australia. For example, the Women in Games in Australia website contains very little information overall, and does not identify any specific women working in the industry (perhaps other than the author of the site) (See Appendix 17, Item 18). One particular role modelling event the current study identified is a Wired Women talk held as a part of the *Game On* conference (Brisbane, 2009).⁸³ Online comments from a blog reporting this event indicate that it provided suitable role models (See Appendix 17, Item 50); so much so, that an attendee blogged how motivating the event had been:

I enjoyed the talk immensely. I liked that it was more focused on the career side of the gaming industry and how it is open to women - I was pretty inspired to run out of the room and go finish my IT course. (Appendix 17, Item 43)

3) SCAFFOLDING

Bandura’s *SCT* suggests scaffolding involves an individual learning skills and practices by working with and being guided by other people (or entities). Learning in the work setting often occurs through mentors. Bussey and Bandura (1999) suggested that same sex role models enhance scaffolding experiences, increasing role identification and even rewarding motivation. However, findings reveal there are few female mentors in the participants’ immediate work environment: *“They’re all hims...there’s no hers”* (G1). A games worker further noted:

There’s not a lot of role models and so that if you were to go into one of those roles you wouldn’t necessarily have someone, another woman, that you could look up to or mentor, who would mentor you and who you would ask for advice. That sort of stands out to me. (M8)

Scaffolding involves mastery opportunities, which could be facilitated by other people or by access to resources. For example, access to learning resources in their childhood helped one participant gain programming skills: *“My dad would get commodore 64 magazines and so I’d just copy out programs”* (G2). One stakeholder, an educator, identified the need for such scaffolding when teaching her students programming within a university degree focusing on games development. She highlighted that, because learning programming presents challenges for the diverse range of students who come from design, animation and writing backgrounds, *“you need all of the scaffolding that you can to get into it”* (S2). She went on to identify the limitations in

⁸³ The event was held at the **State Library** of Queensland. The researcher both attended this event and searched for online comments (on the internet) following the event.

how programming was taught: *“When you do get exercises they’re the same ones that used to give us in maths. You know those really weird ones like one man digs a hole in a field and it takes him six hours”* (S2). She made the point that boys persevere with learning coding *“because you get a lot of boys who actually possibly already kind of realise that that’s where their friends are”* (S2). She suggested boys have mastery opportunities early on, before they enter formal education pathways: *“Some of them come in already kind of implicated into that sort of field. They know where they want to be because they know before, they’ve seen it”* (S2).

5.3.4 OPERATIONALISED THEORY: SOCIAL COGNITIVE CAREER THEORY (SCCT)

Empirical data was re-analysed using only one concept from Lent et al.’s (1994) *Social Cognitive Career Theory (SCCT)*—the concept of self-efficacy. Self-efficacy (or more informally, ‘confidence’ and skill development) featured strongly in participants’ accounts. *SCCT* offered theoretical triangulation with Bandura’s *SCT* regarding self-efficacy. Furthermore, Lent et al. (1994) also presented 12 propositions regarding their theory; several involve person characteristics such as values (p. 91) and problem-solving (p. 99), and others include environmental influences such as social persuasion (p. 102).

As will be discussed in 6.2.5 in the next chapter, in later stages of analysis and theorisation, Lent et al.’s (1994) work sensitised the researcher to other possible influences.

5.4 FRAMEWORK 3: ONTOLOGICAL (CRITICAL REALISM)

Chapter 3 proposed that an ontological framework, based on Critical Realism, could help guide data analysis. Critical Realism requires the researcher to identify the causal effects at play; that is, the underlying mechanisms. Accordingly, empirical data was analysed using Bhaskar’s ‘three domains of reality’: 1) empirical, 2) actual, and 3) real.

Analysis revealed the participants’ experiences, specific events, and importantly, the underlying mechanisms that manifest in the interaction of the environment and person. As Table 45 illustrates, earlier analysis of participants’ experiences using Framework 1 provided an insight into the first two domains of reality, ‘empirical’ and ‘actual’. Therefore, there was no further analysis of these two domains. Similarly, Framework 2 had sensitised the researcher to mechanisms involved in interaction, mostly through an abductive logic. Re-analysis of the empirical data, by employing retroductive logic, led to the identification of 10 mechanisms, which are presented as the *Five Acts of Agency (FAA)* model.

As discussed in the following chapter, the combination of the insights from the analysis of data using the three frameworks (proposed in Chapter 3) led to the conceptualisation of agent-driven mechanisms. The findings here begin to report on the theorisation of the phenomenon of women's participation; however, detailed discussion is reserved for the following chapter.

Table 45 How the three frameworks illuminated the three 'domains of reality'

Domain	Real	Actual	Empirical	Findings
Experiences (The real and the actual that is experienced by individuals)	x	x	x	Empirical experiences of participants were illuminated by Framework 1.
Events (The domain of events)	x	x		Framework 1 also drew attention to 10 specific events of interaction. These events of interaction provide an insight into the 'actual' domain.
Mechanisms (The domain of causal tendencies)	x			Framework 2 sensitised the researcher to mechanisms. Framework 3 explicitly focuses on abstracting mechanisms

5.4.1 AGENT-DRIVEN MECHANISMS

The findings reveal 10 mechanisms involved in the interaction between a Person (P) and their Environment (E). These mechanisms are driven by the person, in contrast to those that arise from the environment. When women harness these mechanisms, it can result in actions that foster their participation. As Table 46 presents, these agent-driven mechanisms are: 1) accessing, 2) imagining, 3) doing, 4) belonging, 5) sharing, 6) problem-solving, 7) transforming, 8) emotion, 9) ethical and 10) being. These mechanisms are organised into five categories of 'acts of agency', which are: 1) enabled, 2) connected, 3) collaborative, 4) creative, and 5) human. These 'acts of agency', and the mechanisms within them, are presented as a model of the *Five Acts of Agency (FAA)*.

Table 46 The *Five Acts of Agency*: The underlying agent-driven mechanisms

Five Acts of Agency				
1. Enabled	2. Connected	3. Collaborative	4. Creative	5. Human
Access to core tools and resources such as technology, people, and information	The beliefs and motivations of the agent, including self-efficacy	The social relationships that foster involvement	Problem-solving, or the power to transform	Human-only traits of emotions and ethics
Agent-driven mechanisms				
1. Accessing (Technology, Information, People)	2. Imagining 3. Doing	4. Belonging 5. Sharing	6. Problem-solving 7. Transforming	8. Emotion 9. Ethical 10. Being

AN ACT OF AGENCY

There are three components to the ‘act of agency’ concept (as illustrated in Figure 12):

1. the agent-driven act;
2. the specific mechanisms involved in the particular act;
3. the outcome or consequence of that act.

As the following chapter discusses, the ‘agent-driven act’ (Point 1, Figure 12) is a high-level concept combining Human Agency theory and Critical Realism. The ‘agent-driven mechanisms’ (Point 2) include both those mechanisms that the *HAMTS* sensitised the researcher to, and those that emerged from the retroductive process; in both instances, these are supported by empirical data. The ‘outcome of the act’ (Point 3) requires consideration of the consequence of these acts and mechanisms, which in the current case study, is women’s participation.

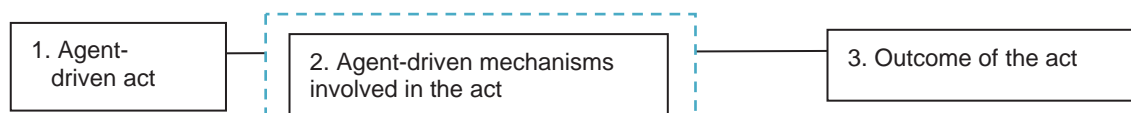


Figure 13: Components of an ‘Act of Agency’

THE FIVE ACTS OF AGENCY (FAA)

Each of the agent-driven mechanisms within each of the five acts (or categories) is illustrated with concrete empirical research data (Figures 13-18). Table 47 provides an exemplar for each of the agent-driven mechanisms. As a Critical Realist approach requires that theorisation remains linked to the concrete data, Chapter 6 presents further empirical data to support the researcher’s conceptualisation of mechanisms.

Table 47 *Five Acts of Agency*: Empirical evidence of agent-driven mechanisms

Act of Agency	Agent-driven mechanisms	Example of mechanisms in the empirical evidence	Illustrative quote
Enabled	Access (Technology, Information, People)	Access: Access to resources such as hardware, software, and employment pathways via networking	<i>"...unless you're really well networked it's quite difficult to get a leg in, in this city" ... "you have to find a way to become involved and there are barriers to that because it's not something highly visible" (M5). "...to find that environment I think that was the hardest thing" (G5).</i>
Connected	Imagining, Doing	Imagining: Aspiration and motivation scaffolded by role models and goals Doing: Developing skills and confidence in the domain area	<i>"there isn't an image of a hot female programmer out there that people want to emulate or aspire to" (G4). ... "it just came very easy to me. That made me start thinking maybe I can actually go a bit further with this" (M4).</i>
Collaborative	Belonging, Sharing	Belonging: Norm knowing and awareness of sanctions Sharing: A sense of contribution and feeling valued	<i>"...there's a lot of reward to be gained from collaborating with people. People ask me questions and I ask them questions about stuff which shares skills and knowledge" (M5).</i>
Creative	Problem-solving, Transforming	Problem-solving: Enjoying the challenge of learning software, meeting client briefs; intrinsic rewards of solving problems Transforming: Intrinsic rewards of creating new objects or practices	<i>"The things that I didn't enjoy about it was that it's not a creative industry and that was what I wanted" (G7). "I like challenging projects that make me think and bring about new ideas, finding new ways to resolve them, improving myself over time" (M7).</i>
Human	Emotion, Ethical, Being	Emotion: for example, passion, guilt, risk anxiety Ethical: moral congruence, types of products Being: personal reflection	<i>"It's a cycle in that you know everyone is passionate about work to put in these hours" (G6).</i>

1) **ENABLED 'ACT OF AGENCY'**

The Enabled Act of Agency requires the person to employ the mechanism of 'accessing' resources such as information, technology and people.

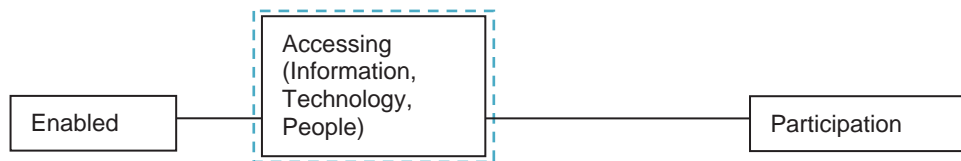


Figure 14: The Enabled 'Act of Agency'

INFORMATION- The mechanism of *accessing* was evident when participants indicated that access to information was an influence on their participation. A lack of information was seen as limiting the choices participants made: *"I don't think it was ever something that I was interested in because I didn't know enough about it but now I know it I don't think there's anything else I'd prefer to do"* (G1). The actions women took were to purposively seek out information, such as job postings on game development websites (such as gamedev.net). Another participant suggested that the education system had not provided her with adequate information regarding career choices: *"School didn't give us that information I went to company websites...It's hard to really say definitively girls are being discouraged or whether there's just not enough information...it never occurred to me in high school there was no information perhaps ...I didn't take IT when I was in high school and I regret that now"* (G2).

TECHNOLOGY- The mechanism of *accessing* was evident when participants indicated that access to technology, in particular computers, was an influence on their participation. Access to free software was seen as integral to developing skills that may lead to employment: *"It's interesting because there are new ways to get a job... there's free online engines so these kids are actually making them at home"* (G7). Technology resources also offered flexibility to work from home, which may be relevant for working parents: *"Flexibility is ...I might be able to do some work at home because I've got all the software at home and I've got access to work"* (G7). Technology resources were important over their lifespan, including their childhood, education and careers. For example, a lack of access to computers presented women with challenges during their education:

When I was doing it, it was even harder because hardly anyone had a computer at home, you'd have to go to the lab and wait two hours until there's one free and you're only allowed on for three hours but your lab for that week could take nine hours. (G3)

PEOPLE- The mechanism of *accessing* was evident when participants indicated that access to people (both people in the immediate organisation and also across the industry) was an influence on their participation. Having connections or networks was integral to women's entry and continuation in the workforce; however, many positions in

the DCI are not widely advertised: *I didn't think we advertise jobs that widely. To be honest most people that come in are people that someone already knows*" (G6). Access is often fostered through social connection based on friendships and professional networks. The industry was *"competitive"*, and *"unless you're really well networked it's quite difficult to get a leg in, in this city"* (M5). Also, *"having friends who are involved in the industry is a good way to start"* (M5). Connections could occur in unlikely places; for example:

To get into it it's a definite – networking is really, really important. I got my first job joining the [IGDA], just going down for casual beers and a barbecue and meeting people who are in the industry" [...] *"you have to meet the right people who are making the big games and the decisions.* (S1)

A participant described feeling ostracized because she had been moved into a management position where she was actively discouraged from mixing with the employees she managed, and where most of the others managers in the organisation were male. Therefore, this participant was pressured to forgo one of her key social links in the organisation. In response she took action, and *"looked to network with my clients, rather than my work buddies and that really worked"* (M4). Later, she started going out with one of the males who worked in the production area and, through this, *"built up a network"*. If there was no social network in the immediate workplace, participants utilised alternatives such as Facebook and LinkedIn.⁸⁴

2) CONNECTED 'ACT OF AGENCY'

The Connected Act of Agency requires the person employ the mechanisms of 'imagining' (or visualising) their participation, and then gaining appropriate skills through 'doing'.

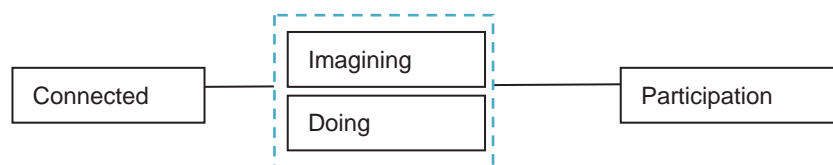


Figure 15: The Connected 'Act of Agency'

IMAGINING- The mechanism of *imagining* was evident when participants indicated that being able to visualise or imagine their participation was an influence. There were several environmental influences that constrained women in doing this, including the lack of role models, unclear career pathways in the DCI, and unclear rewards (for example, lack of information regarding salaries). A participant described how seeing the industry context whilst on a volunteer work placement in a games

⁸⁴ LinkedIn is a social networking website for professionals.

development company, helped her connect to the industry. She said that *“just the fact that I was being invited into a games to see what it was like on the inside, that was a huge thing”*, and that *“you really need that connection”*.

Secondary data sources support the finding that participation may be fostered if women or (as the example below suggests) young girls imagine themselves in a DCI role. The following comment is by a blogger reporting on strategies to foster women’s involvement in games. Visualising or imagining future rewards can be a motivator:

‘Open Days’ for school children so that they can realise this kind of career DOES exist - she believes that is the age that you need to capture someone's imagination for it. (Appendix 17, Item 43)

There was a paucity of information regarding careers in the DCI: *“Without the active promotion, it’s not on peoples radars”* (G2). There was also inaccurate information: *“If you haven’t seen it you always think of IT as boring numbers”* (G7). Participants suggested that the lack of accurate information constrained their ability to visualise their participation:

The major barriers for females entering this industry would be in their own minds. Most developers are keen to hire women, perhaps even over men, but they don’t apply for the jobs. I think maybe women see it as a men’s industry. (G6)

DOING- The mechanism of *doing* was evident when participants indicated that developing skills required by the industry was an influence. When a participant mastered technical skills, they felt confident in pursuing that career path - they gained a sense of self-efficacy: *“It just came very easy to me. That made me start thinking maybe I can actually go a bit further with this”* (M4). The empirical data suggests that participants could gain, foster and maintain skills outside of formal training by using *“tutorials, reading articles doing everything I could”* (M6).

3) COLLABORATIVE ‘ACT OF AGENCY’

The Collaborative Act of Agency requires the person employ the mechanisms of having a sense of ‘belonging’ and ‘sharing’ experiences with other agents.

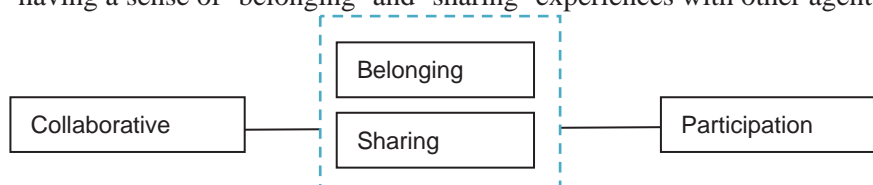


Figure 16: The Collaborative ‘Act of Agency’

BELONGING- The mechanism of *belonging* was evident when participants suggested that being able to feel as though they belonged in their environment was an influence on their participation. Participants valued collaborative and socially orientated

work environments, where *“everyone has input”* (G3), and it *“feels more just like a group of friend’s kind of interaction”* (G4). Although participants emphasised that they valued the social aspect of the workplace, they also identified that the male dominated environment could constrain their ability to make friends: *“Maybe it’s more of an acceptable area of interest for the guys than the girls, and more of their peers are in there, so you know, with all of the social network and all of their friends in there”* (G8). Women found it *“frustrating”* in regards to *“the chance to make friends”* (G3). When faced with male dominated education environments at university, one participant found living in a female only campus residence helped her make friends whom she could then *“draw on”* (G3), even though they did not attend her IT classes. Secondary sources suggest that a sense of belonging is important in the education context. For example, comments by the IGDA Women in Games SIG panel (Appendix 17, Item 11) identify that women may feel as though they don’t belong in games degrees:

Fullerton observed that when young women come to her game design class, they often sit in the back and think that they don’t *belong* [emphasis added]. (Appendix 17, Item 11)

A need to interact with other people featured highly for participants. One participant stated that even though she valued a high level of autonomy, where *“It’s kinda my way”* (M1), she enjoyed working in a team. Another participant identified that although she enjoyed the flexibility of her freelance work, she needed to interact with other people, face to face, rather than through mediating technologies: *“I just like that sort of personal interaction [...] you sort of get more than just some email”* (G8). The DCI, for the most part, presents a team oriented environment; it is no longer *“a guy programmer playing on his computer coding in his garage”*, but rather *“quite a close knit sort of group”* (M2) with teams of *“forty people for one Playstation game”* (G2).

In this team environment, being liked by others was crucial. Participants described the positives of liking colleagues: *“I actually found that I really liked the people there and I really liked the team... It was a fantastic environment, it was a really, really, really good environment”* (G8). However, even though the participant liked her colleagues, she felt isolated in some ways because *“I was like the only one doing anything in graphics and multimedia”* (G8).

A sense of belonging balanced other influences likely to negatively influence participation. For example, long hours associated with ‘crunch time’ were seen as being less of a negative influence as a result of the sense of family in the workplace: *“You’re working with such lovely people [...] like a big family”* (G2). Hence, relationships in the work environment were important and participants described scenarios that negatively impacted on their participation as involving *“shit work relationships”* (M4). A positive

work environment was where people shared experiences. As an employer noted: *"In a work environment you need people who understand you and you can talk to...yeh your mates with and you can share things and I think that's what a balanced work environment is"* (S3). However, women sometimes faced certain constraints in feeling as though they belonged as a result of the actions of male colleagues: *"It still feels different, like I feel like they're treading around me"* (M6). Conversely, they could also feel supported by their male colleagues: *"I'm lucky that the boys on my team are supportive"* (G1). Practices such as work related meetings being held in pubs and strip clubs can hinder women's capacity to collaborate with colleagues. Even in meetings held in the workplace, women could feel as though they were different—the minority:

I really like the meetings we have because it's like a massive brainstorming session but then if it's a whole team thing then it should be a whole team thing if you know what I mean and yeh that's when I do feel like a minority. (G1)

Like often if there's sort of a whole group of men they won't necessarily try and include a woman and she may not feel like – if they're all talking about football I'm not going to put up my hand and talk about football because I don't know anything about that, for example. (M8)

There were numerous empirical examples of how women could develop a sense of belonging, for example, through the clothing worn (as previously noted). Belonging may also occur through speaking the same language, such as technical jargon, and sharing interests and leisure pursuits, such as playing games. In some cases, a sense of belonging occurred simply due to the length of time colleagues had worked together: *"I've worked with the guys that – who are the artists for the last three or four projects so it works on a personal level"* (G7). For one participant, this sense of belonging balanced out the limited opportunities for skill development within her (public) organisation: *"the lovely people, that's why I stay"* (M2).

Participants identified the importance of a sense of support from other people for their career progression: *"Unfortunately it's really hard to go up from an associate or an assistant producer to being a producer to take on that complete responsibility without the support of your company"* (G5). This support came from different sources, including a *"mentor or just someone, or in my case my boyfriend who's also on the same team"* (G5). Some women were very active in fostering collaboration, recognising that their career progression hinged on being perceived as fitting in and accessing opportunities: *I was really aggressive about wanting to fit into the team, about wanting to learn as much as possible, to compete with the other juniors that were hired at the same time as me. I know I talked about a collaborative environment but I still like know I'm being measured. So I always went to lunch with the bosses and we talked about work.* (G3)

SHARING- The mechanism of *sharing* was evident when participants suggested that being able to share experiences and information, knowledge, and resources with others through social interaction was crucial for women’s participation. For example, participants recognised the value of learning from mentors: *“I wanted someone to learn from”* (G8). However, there were few mentors, and fewer female mentors. Working alone was seen as a negative influence: *“I was it, so there was no-one there to learn from. So I was just enjoying the social aspect of it, and doing that job, which was quite challenging because I was only one doing it”* (G8). Sharing was fostered through the availability of information and resources, which more than often were accessed from outside a work context; for example, from online communities which offered not just a social value but, importantly, a professional connection. One participant, a web coder, indicated that everyone in the web development community relies on each other’s code, such as JavaScript and CSS: *“You borrow very, very heavily. So yeh it seems like everyone works of each other’s back in this industry”* (M5).

4) CREATIVE ‘ACT OF AGENCY’

The Creative Act of Agency requires that the person employ the mechanisms of ‘problem solving’ and ‘transforming’ objects or entities.

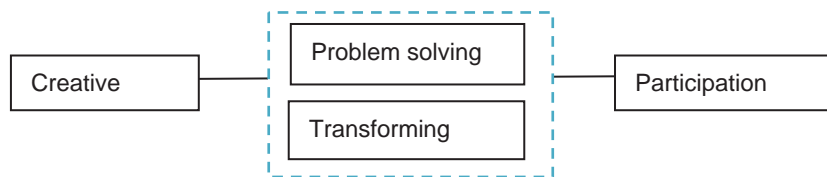


Figure 17: The Creative ‘Act of Agency’

PROBLEM SOLVING- The mechanism of *problem-solving* was evident when individuals noted that intrinsic rewards, often involving solving challenging problems, influenced their participation: *“It’s not a professional environment at all it’s really like getting together with a bunch of friends and solving problems and in that respect it’s one of the brilliant environments to be employed in”* (G2). Problems included coding problems, meeting clients’ briefs or staying up to date with technology.

Problem-solving skills were seen as being integral to certain roles, such as programming. DCI workers needed to have a *“fascination with how things kinda of work”* (M5). A participant proudly described her problem-solving traits: *“If you want to know how something works look at something someone else has already done and pull it apart and put it back together yourself and that’s pretty much ummm how I sort of approach things”* (M5). However, problem-solving was perceived as a trait that women might not possess: *“I guess a lot girls don’t go into programming at university. Umm perhaps they’re just not interested in problem solving”* (G6). A stakeholder reflected:

I think they usually have an interest in tinkering with something, [...] It's the mechanics of what makes it work that interests them and keeps them at their desk, problem solving. So let's say if they weren't in multimedia or Flash they'd be in another problem solving area... [interruption] it's kinda the ways brains wired. (S3)

Problem-solving manifested differently in different roles; for example, in programmers finding coding solutions: *"Programming, I can organise things, and follow patterns and like doing it, it's like solving a puzzle"* (G3). Problem-solving also manifested in managing other people or clients' needs; for some, it was *"challenging when the client says I want this and you try to make it something that meets their standards I guess that's where the challenge comes from"* (M6). Others enjoyed the challenge of bigger picture problem-solving: *"You know, technology's a very small part in a business, even a technology business. Some guys just want to focus on that area. They'll get a problem or a puzzle and they can keep their head down"* (G8). One reason why the business side was more appealing was that *"it is more about people interaction"* (G8).

Participants were motivated to pursue roles that offered them a challenge: *"They sort of spread us out to make sure we learn everything and can do everything, that's kind of what I'm interested in"* (M8); and *"I like challenging projects that make me think and bring about new ideas, finding new ways to resolve them, improving myself over time. There isn't so much of that here"* (M7). Similarly, another said: *"I think it's a positive as well because that's why I like my job... There's something new, a challenge"* (M10). The capacity for challenges influenced participants to pursue a career in the DCI: *"It's challenging, and it's fun, it's creative. I couldn't imagine filing papers and answering phones all day"* (M6). Thus, occupational roles that did not offer participants challenges were seen as unappealing:

People just do the same thing over and over again and then after awhile you can't—I don't know. It doesn't work your muscles in terms of your brain muscles, in terms of your challenges, in terms of your problem solving. So I think that's a big problem. (M7)
I get bored easily, what I won't bored easily would be with computers and would be because there's such a variety with multimedia there's always something different to do in it, because you'll always have to learn new things. That will keep me just hanging for a long time. And so that's why I went with multimedia. (M7)

Challenges motivated participants: *"Whatever it is you do you always get to a point where you're ready for any challenge"* (G8); and *"I remember it being really hard because everyone else had used it before and I only just passed...But it was just the challenge of it that drew me to it"* (M6). Although they were often motivated by challenges, the participants also valued some flexibility to manage these challenges; it was *"hard to work in a creative industry"* (M4). One negative was the demand of learning the new technology: *"I guess one negative would be [inaudible] the learning curve again"*

and again and again" (M9). Others noted that *"after being challenged so hard so long"* (M2), it could impact their health: *"Sure it's great to be on the cutting edge - it's more creative & challenging - but it's also incredibly tiring and stressful"* (G3). Certain roles such as programming were more demanding, more *"taxing because like the technology changes every, I'd say 6 months to a year so you're constantly reading and learning"*. However, she maintained that she *"loved it"* (G7). Another noted that when she was first learning, it *"was difficult, the workload was difficult but I thought that was fun"* (M6). Secondary sources also support the finding that the DCI is appealing to workers because of the challenges and opportunities for innovation that it offers:

Game designers both women and men say the industry allows them to push technology in ways that they wouldn't be able to incorporate IT departments. They also have growing opportunities to use gaming technology in innovative ways. (Appendix 17, Item 33)

TRANSFORMING- The mechanism of *transforming* is difficult to describe as there are few empirical examples of this type of creativity. When participants were asked to provide an example of how they were creative, one described a creative act as a game developer creating a character and bringing it life. Thus, it was interpreted that the mechanism of transforming involves transforming entities such as artefacts, ideas and processes. Participants chose DCI occupations believing they offered greater opportunities for being creative than other industries: *"I was interested in lots of different things...They were photography, fashion design so creative type things"* (G8). This insight supports previous studies that report that students choose multimedia and games because they are seen as more creative than IT (State of Victoria, 2007): *"What I did before I loved because it allowed me to travel but it was boring...The things that I didn't enjoy about it was that it's not a creative industry, that was what I wanted"* (G7).

Participants valued creative work.

There's so many different jobs in this industry, some are creative and some are not. I think I wasn't fulfilling my creative needs quite early on. When I first got into it I was saying I was very passionate about design and I was doing a lot of hours. I felt like I was expressing a lot of creativity in this work. I think that disappeared fairly quickly, having to design within the limitations of corporate. So it just became pretty much just churn work, really. You tried as much as you could to put creativity into it but you're quite limited. (G8)

Smaller "indie" organisations were seen as offering greater opportunity for creativity. Larger organisations were seen as being *"really risk adverse and so with the games designs they just won't do anything innovative or exciting"* (G3). Similarly, government organisations constrained creativity: *"I like innovation and I like finding new things, doing new things, experimenting the new things, it's really hard in a government*

environment – they're non-existent" (M7). Although one participant positioned creativity in opposition to technical skill–*"the course that I did at uni wasn't as creative...it was very technical"* (M6) –creativity could involve art or code; *"to be good in any job you have to be creative"* (M1). Participants' comments suggested that creativity manifested differently across different interactive content creator roles.

5) **HUMAN 'ACT OF AGENCY'**

The Human Act of Agency requires the person employ mechanisms such as 'emotion', 'ethical' and a sense of 'being'.

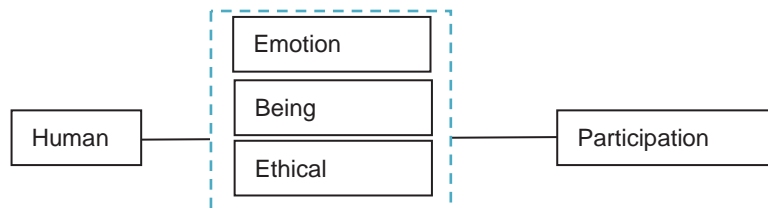


Figure 18: The Human 'Act of Agency'

EMOTION- The mechanism of *emotion* was evident when participants suggested that emotions were an influence on their participation. A wide range of emotions were identified by the female respondents, including: boredom, fun (G2), frustration (M4), passion, fear, loneliness, desire, anxiety, anger, guilt (M1), and obsession (G7). For example, one participant was 'pissed off' (interpreted as anger) that a male colleague was earning more than her in essentially a similar role. Another described the 'excitement' of working on a new project: *"I've never worked on a realistic game...I was like this is so exciting..."* (G7).

The emotion most cited by participants was that of passion. Indeed, both stakeholders and the extant data identified passion as a necessity to work in the industry: *"Like it's really hard to work in a creative industry so they have to be really passionate and if they have that they're going to succeed, they will, they will succeed"* (M4). However, maintaining passion became a challenge: *"It's a cycle in that you know everyone is passionate about in work to put in these hours so then it's expected, and so then it becomes the norm and then everyone else has to put in"* (G6). Losing their passion for the work led them to consider leaving the industry: *"I just knew that I don't have the energy and I don't have the passion for that any more. I certainly did but I grew out of it, so I need to get out of it now before I am stuck here, having to learn the next version"* (G8).

Passion could counter negative influences on women's participation, including the lack of financial rewards the industry offered: *"The money's not there, it's really not there...I think the only reason you would enter games because you've got a passion for games"* (G1). Passion was seen as integral to their lives and not only the workplace: *"If*

you're not following up a passion, I think that side of you will be unhappy and that unhappiness will influence other bits, home life, relationship and everything like that"

(M4). Secondary sources support the importance of passion for DCI workers: "I believe that talent, drive and **passion** [emphasis added] are the keys to success. Race, gender, sexual orientation and the like are completely irrelevant" (Appendix 17, Item 28-, M, 32, White, Ma, USA).

As noted earlier in the findings, there was a perception by both participants and a stakeholder that men were more passionate about their careers than women. The level of passion appears to be linked to the experience of playing games: *"Passion also means basically doing things around the periphery of that area. So even if it wasn't gaming but if it was just doing volunteer websites or something like that in a non-gaming industry, which is doing something that was external, I didn't find a lot of the girls were doing that"* (G8). The 'guys' were seen as being more passionate than women because they played games and contributed to forums, *"whereas the girls, no, never once did I see a really, really passionate girl"* (G8).

Developing an interest in playing games from an early age could support passion, and it was suggested women had not been exposed to games in their childhood: *"I guess they just haven't been exposed to it...it's a lot about how much you like games, games you like, games you've played, how much you think about it"* (G6). However, comments from participants suggested that the belief that working in the industry entailed playing games was a misconception: *"I make music and sound effects for a range of different products but I don't play that many games"* (S1); and *"There's always that mentality of oh yeah, well I play games, I think I should go and make it games. It doesn't work"* (G7).

Other emotions included fun. Participants' accounts suggested that simply having fun supported their participation in the DCI: *"I guess if it's something your friends are doing then you're probably more likely to get into it. It's fun because you share those social experiences with other people"* (G6). The *Events of Interaction* model drew attention to other emotions such as anger regarding inequitable pay (the Catch 22 event mentioned earlier), and the guilt of being a working parent (the Motherhood event mentioned earlier).

ETHICAL- The mechanism of *ethical* was evident when participants suggested that ethics were an influence on their participation. For example, when a participant suggested bullying in the workplace as *"not right"* (M4), the researcher interpreted this as an example of an ethical stance. Another example of ethics surfaced in a participant's account where she explained the value she placed on policies relevant to her role within the government department: *"Because it's government work we have to follow policy and it makes me think I wonder if there's a policy on that...having that as a priority as well as*

my work skills in what I do" (M4). The secondary data suggests that social value of occupational roles is an influence within the ICT field:

Anyway, I got disenchanted with tech from a values standpoint... I didn't think what I was doing mattered enough. So, I tried a career change. I went into Psychology [...] and got a job in the field where I felt I'd be helping people. Turns out that field seemed even less 'helpful' to people than tech did. (Appendix 34)

In the DCI context, participants made indirect reference to the social value of their occupational roles. One participant, who worked as an online content editor (M8), enjoyed her role because it facilitated a wide range of people being able to make comments on a blog. Her background had been in journalism and she saw her current role as facilitating aspects of participatory journalism. Similarly, a media producer identified that a positive of the industry was that it sometimes creates products with social value: *"There are projects that are social projects like road safety and things like that, it doesn't always have to be advertising based"* (M9). In contrast, one participant who had been involved in producing reflected on the appropriateness of the violence in certain games, and noted that her attitude to those games had changed since having her first child: *"I love violence in terms of the games that I play, I enjoy it... But I now have a little boy... and for the first time ever I'm going oh, I don't know about this. I mean it's fleeting ... So it's like hmm"* (G7).

Although certain aspects of the DCI, such as games content, are linked to what might be seen as unethical aspects there is a grey area surrounding these. For example, one stakeholder noted that the violence in games was being judged as being different to the violence in movies. If a *"movie depicted certain violence is okay but in a game because – this is the difference – because you're the one instigating that violent act, it somehow falls into a different category"* (S1). The hacker culture, which may be judged as being unethical, can also be perceived as requiring talent. In reference to the hacking culture a stakeholder stated: *"I don't call that deviant I call that critical thinking"* (S2).

BEING- The mechanism of *being* was evident when participants' comments suggested that other, less tangible, mechanisms were at play. The mechanism of being is perhaps the most difficult to illustrate from the findings as it is a somewhat existentialist concept. It is, however, best exemplified by the individual's capacity for reflectivity. Participants were reflective when they recounted their own experiences and reflected on the thoughts and actions of others who influenced their participation. Further examples are offered in Chapter 6, where the empirical data is linked to previous research and theoretical work.

5.5 CHAPTER SUMMARY

The descriptive and explanatory findings presented in this chapter stem from the logical, multi-level analysis of the empirical data. Application of each of the three frameworks proposed in Chapter 3—1) analytical, 2) theoretical, and 3) ontological—to the analysis of the data reveals different influences on women's participation. In addressing Research Question 1—What are the influences' on women's participation in the DCI?—the analysis of empirical data revealed many influences; these included environmental characteristics (such as the occupational stereotypes), the cultural practices and the resources women had access to. The application of the frameworks has also helped address Research Question 2—How might we understand these influences?—because each framework not only allowed for the identification of different influences, but also different interpretations of the influences on women's participation.

As Section 5.2 revealed, application of Framework 1—the analytical framework—led to the description of the characteristics of the Environment (E), Person (P), and specific examples of Interaction (I) that may influence women's participation. This description has involved, as Danermark et al. (2002, p. 122) recommended, reporting different empirical characteristics and types of events. Refining this initial framework led to the development of the *Sphere of Influence (SoI)* model (as noted in Section 5.2.4). The *SoI* model categorises the Environment (E) characteristics that influence women's participation in the DCI into four dimensions: social, cultural, mediated and resource dimensions. Within these dimensions are properties which offer a further level of granularity. Person (P) characteristics include a women's social identity. Interactions (I) between the E and P were evident in the events participants recounted, such as becoming a mother. Ten events were encapsulated the *Events of Interaction (EoI)* model presented on p. 163. Together the two models, the *SoI* and the *EoI*, began to offer a unified approach towards describing the interactions between the environment and the person that may influence a person's participation.

As Section 5.3 revealed, application of Framework 2—the theoretical framework—led to both the further identification of influences and a deeper understanding of influences. Framework 2 was comprised of the *Human Agency Multi-Theory Scaffold (HAMTS)* proposed in Chapter 3. Human Agency theories provided several concepts, such as self-efficacy, for data analysis. These concepts assisted in the explanation of the empirical data. For example, participants often referred to their self-confidence and how this confidence could influence their participation. Bandura's concept of self-efficacy helped explain this confidence. There was empirical evidence to support all 11 of the human agency concepts from the four agency theories in the *HAMTS*. Therefore, it is

evident that agency theories offer a useful perspective with which to investigate women's participation in the DCI.

As Section 5.4 revealed, application of Framework 3—the ontological framework—led to the identification of 10 agent-driven mechanisms that can influence women's participation in the DCI. A Critical Realist approach entails the identification of mechanisms. There are ten agent driven mechanisms identified in the findings (see section 5.4.1): 1) accessing, 2) imagining, 3) doing, 4) belonging, 5) sharing, 6) problem-solving, 7) transforming, 8) emotion, 9) ethical and 10) being. These mechanisms are organised into five categories of 'acts of agency', which are: 1) enabled, 2) connected, 3) collaborative, 4) creative, and 5) human. These 'acts of agency', and the mechanisms within them, are presented as a model of the *Five Acts of Agency (FAA)*. These mechanisms are driven by the person, in contrast to those that arise from the environment. When women harness these mechanisms, it can result in actions that foster their participation. The following chapter discusses how this identification was aided by drawing on all three frameworks.

Although each individual framework provided a way to identify and understand influences, the synthesis of the findings emerging from the analysis of data using the three frameworks led to the original conceptualisation of agent-driven mechanisms. The conceptualisation of these mechanisms is the key theoretical contribution resulting from the research findings. The following chapter provides a greater level of theorising of these findings with linkages between 'concrete' empirical data, extant literature, and an emerging theoretical explanation.

"Neither the life of an individual nor the history of a society can be understood without understanding both" (Mills, 1959, p. 3)

Chapter 5 presented the findings resulting from the application of the three frameworks (proposed in Chapter 3) to the analysis of the multiple sources of data collected for the case study. The findings reveal that each of the three frameworks helped in identifying and understanding the diverse range of influences on women's participation in the DCI.

This chapter discusses those influences, within the context of the three frameworks, and with reference to further extant research. The findings suggest that the three frameworks can offer an approach to identifying influences. Many of the influences identified using these three frameworks have been identified by previous research, particularly research of women's participation in the ICT context. Therefore, the discussion of the influences draws heavily on this prior literature. There are several nuances in the findings that are unique to the DCI context. For example, the outcome expectations of women in the DCI include a sense of reward for a game product they have developed attaining wide social approval or their own sense of pride in the work; these rewards were rated by some participants as being much more important than salary. Indeed, participants noted that DCI workers might even work for free just to have the opportunity to help develop a game that they were proud of. This sense of pride as a motivator has not been noted in the research stemming from the ICT context and in many ways aligns to the pride an artisan may feel towards their craft. Furthermore, findings indicate areas of research that require further investigation. For example the concept of lifespan has been raised in previous research; the findings from this study further support the value of considering temporality when investigating women's participation. Perhaps what is most notable about the findings is not the individual influences, such as the media, but rather the extensiveness of the findings, which identify a wide range of influences for the DCI context.

Importantly, this chapter also discusses the manner in which the three frameworks offered a complementary approach to investigating the influences. Each individual framework provided an approach to investigating the phenomenon of women's participation. However, the most salient contribution that emerges from the research is the synthesis of the findings from each of the three frameworks, which results in the conceptualisation of agent-driven mechanisms. Agent-driven mechanisms offer an original approach to addressing the research problem: 'Why do women participate in the Australian DCI?' This chapter contains a full discussion, interpretation and evaluation of

the findings; it shows how they advance our understanding of the research problem, and their implications for the research area.

As Section 6.1.2 discusses, Framework 1—the analytical framework—identified influences such as the environment characteristics, person characteristics, and events. Environment characteristics include social contexts, culture, resources, and the media. Person characteristics include social identity and, consequently, the stereotypes associated with that identity. Findings also suggest that an influence may be the events that a person experiences. These events may manifest serendipitously; for example, a chance encounter with a mentor may provide an opportunity that is crucial to a person gaining employment. As noted in Chapter 5, the refinement of Framework 1 culminated in the proposal of two models that help reveal the influences on women’s participation: 1) the *Sphere of Influence (SoI)*, and 2) the *Events of Interaction (EoI)*. This chapter discusses the value of these models to the research problem. As Section 6.1.2 establishes, the dimensions and properties within the *SoI* offer a way to organise the diverse range of influences identified from the empirical data. Existing research provides further support for the conceptualisation of the dimensions, and strengthens the resultant model. Section 6.2.3 discusses the value of the *Events of Interaction (EoI)*, a second model emerging from the refinement of Framework 1. As the findings revealed, the *EoI* model identifies 10 events that may influence women’s participation. The discussion highlights that the *EoI* provides a way to understand the (I) Interaction between the Environment and Person. Both the models arising from the refinement of the analytical framework provide a way to organise findings, and provide linkages to existing research.

As presented in Section 5.3 of Chapter 5, Framework 2—the theoretical framework—was comprised of concepts from the *Human Agency Multi-Theory Scaffold (HAMTS)*. Framework 2 identified further influences arising from the individual person’s characteristics, such as self-efficacy, and environment characteristics, such as availability of role models, from the theoretical perspective of human agency. As Section 6.1.6 discusses, some of these influences have also been identified in previous studies; however, agency theory has not been explicitly used as way to understand women’s participation. The findings suggested that such a framework offers a useful approach. As will be discussed in Section 6.1.6, the greatest value of employing the *HAMTS* was that it assisted in the abstraction of mechanisms by drawing to attention the causal effect of the individual agent. The reflection on the methodological value of employing the *MTS* reveals its key benefits to the research process.

Framework 3 identified mechanisms. Mechanisms have not been identified in previous related research as being an influence on women’s participation in the DCI.

As presented in Section 5.4 of Chapter 5, Framework 3—the ontological framework (comprised of concepts from Bhaskar’s Critical Realism)—revealed five categories of agent-driven mechanisms which manifest in the interaction between the person and environment, and influence women’s participation. However, the identification or ‘abstraction’ of mechanisms has presented the researcher with a challenging task. As Section 6.1.8 discusses, this challenge has been addressed in a number of ways, including utilising both an abductive and a retroductive logic during data analysis.

As Section 6.3 discusses, individually, the three frameworks offer a complementary approach to understanding the influences on women’s participation in the DCI. It is, however, the synthesis of findings emerging from the three individual frameworks that provides an original approach to understanding women’s participation. A Critical Realist perspective, in conjunction with Human Agency theory and the empirical data, leads to the identification of agent-driven mechanisms. **The conceptualisation of agent-driven mechanisms is an original contribution resulting from the research presented in this dissertation. Agent-driven mechanisms offer an approach to understanding women’s participation in the DCI.**

As Chapter 5 showed, the empirical evidence supports the conceptualisation of 10 agent-driven mechanisms, as presented in the *Five Acts of Agency (FAA)* model (as initially presented in Section 5.4.1 of the findings). Section 6.2.3 discusses the *FAA* model, and the agent-driven mechanisms in a manner that addresses Stages 5 and 6 of Danermark et al.’s (2002) model; this essentially entails linking the abstracted mechanisms to empirical data, emerging theory and extant literature. Thus, further empirical evidence is introduced in this chapter.

Section 6.3.3 presents further empirical evidence, emerging from this study, to support the conceptualisation of the categories in the *FAA* model. This discussion further reveals the agent-driven mechanisms that are important for women in the DCI context. It might be assumed that this model may be generalizable to other contexts; however, this would entail further research and application of the *FAA* model to those contexts.

Section 6.3.4 provides further synthesis of findings with the proposal of an emerging theory entitled *Acts of Agency*. The theory provides an overall theoretical outcome of the research, primarily by incorporating the previous models, including the *Sphere of Influence (SoI)*, *Events of Interaction (EoI)* and the *Five Acts of Agency (FAA)*. Where the *FAA* model has specific application to understanding women’s participation in the DCI context, it is argued that the *Acts of Agency* theory is further generalisable to other contexts of participation.

Section 6.4 concludes this chapter by discussing how the research goal for applied research is addressed. This entails outlining how the agent-driven mechanisms identified in the *Five Acts of Agency* may be used to propose and evaluate strategies that foster women's participation in the DCI context.

As Figure 19 illustrates, the two research questions are addressed in this chapter through the discussion of the actual influences on women's participation, and of how we can understand these influences. The discussion illuminates a number of research contributions, which include the development of frameworks that can help in the identification of influences and in further understanding those influences. Further contributions lie in the development of a methodological approach for the use of multiple theories to scaffold inductive research that being the *Multi Theory Scaffold*. The penultimate contribution lies in the use of the frameworks to develop the original theoretical conceptualisation of agent-driven mechanisms and to present a model and an initial theory to help address the research problem. Both the model and theory appear to offer a valuable direction for further research.

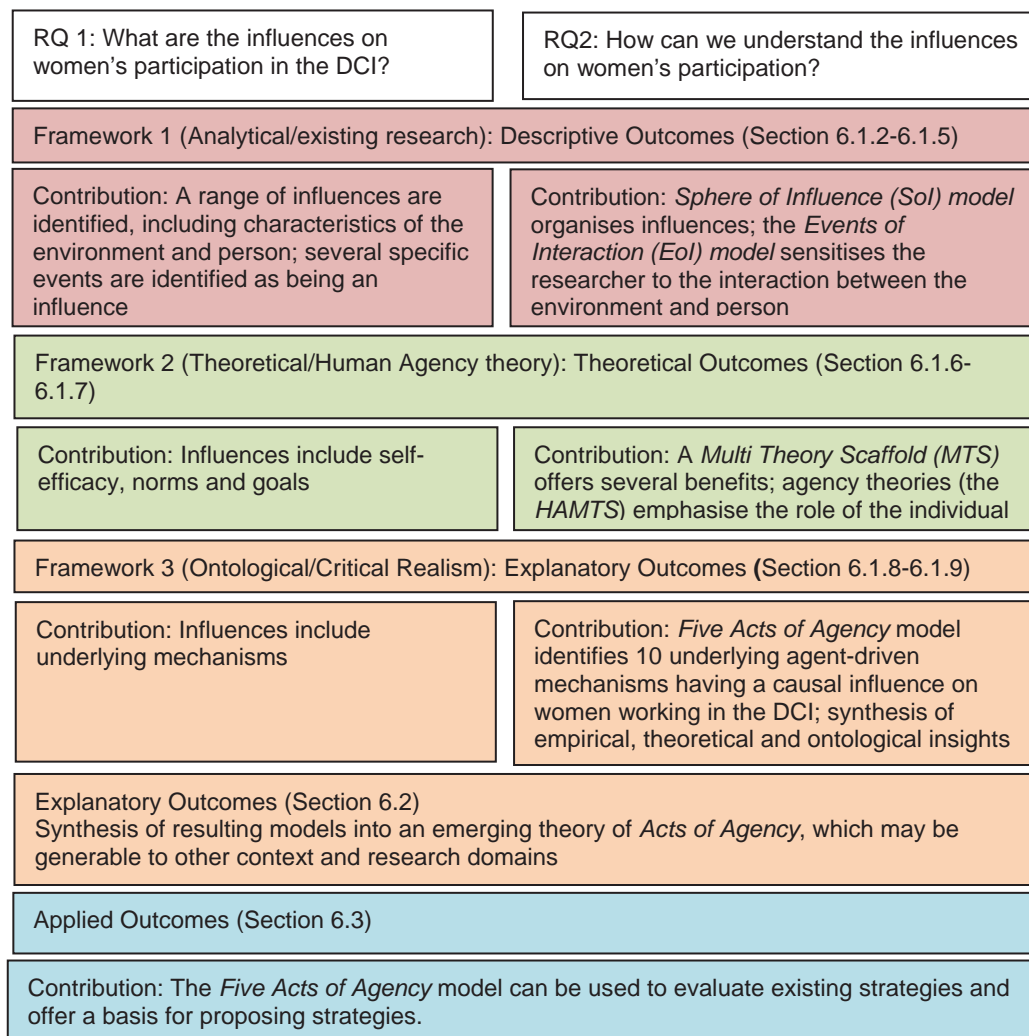


Figure 19: Visual representation of this ('Discussion') chapter

6.1.1 WHAT ARE THE INFLUENCES?

In answering the two research questions—‘What are the influences on women’s participation, and ‘How might we understand these influences’—there is first a need to clarify what is meant by the term ‘influence’. An influence is taken to be an entity that emerges during the interaction between an individual and their environment, and has a causal effect on an individual’s participation. Indeed, the term “influences” can be considered “explicitly” causal (Gregor, 2006, p. 628). Findings suggest that an influence can be a characteristic of the person or environment, an event, or an underlying mechanism. A range of influences have been identified by using the three frameworks for data analysis and several examples of these influences are presented in Figure 20. In-depth discussion of these influences follows shortly.

It is vital that an influence be understood as a dynamic and complex concept. Influences are not necessarily a barrier to participation, where the term barrier implies finite closure; influences can either support or constrain participation. For example, ‘networking’, which has been noted in the findings and the extant literature, can be either a supporting or a constraining influence. Networking can be a supporting influence when it offers what Pratt (2006) describe as a pleasurable “hanging out” in creative industries. Conversely, networking can be a constraint—a compulsory sociality (Gregg, 2008). Thus, the influences identified in the findings are not definitive; they can manifest in different ways in different contexts.

Indeed, one of the limitation of this study is that there is scope to clarify which of these influences is unique to the DCI context. Many of the influences identified in Figure 20 have also been noted in previous research regarding the ICT context. For example, stereotypes regarding women’s capacity for technology skills (as will be discussed in Section 6.1.2) have been noted in the ICT related literature. This may in part be a result of gender stereotypes permeating society beliefs. However, there are influences unique to the DCI context regarding gender stereotypes. For example, many of the products that are produced, such as games, portray women in a sexist manner. A future direction for the research is to revisit the influences identified (for example, those presented in Figure 20) and to identify their specific manifestations within and relevance to the DCI context.

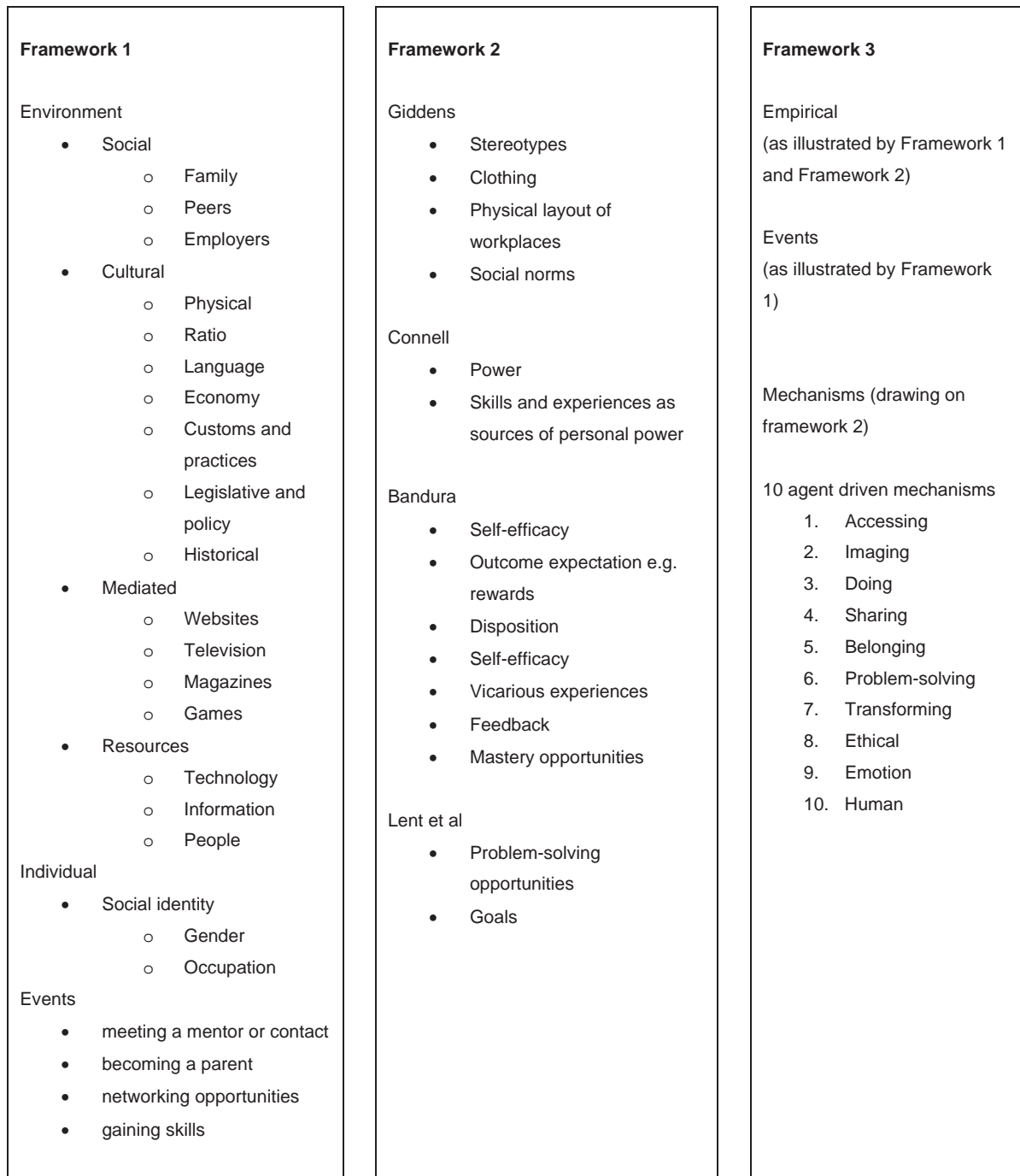


Figure 20: Examples of the types of influences on women's participation in the DCI

In addition, an influence may be perceived or experienced differently by individuals. As Lent et al. (1994) suggest, it is “likely that supports, opportunities and barriers—like beauty—lie at least partly in the eye of the beholder” (p.106). Ideally, an influence such as networking must be understood from the perspective of its meaning to the worker (Gill & Pratt, 2008). What may be perceived as a barrier by one individual may be a challenge, and even a motivator for another. For example, a participant

described how, when facing bullying in the workplace, the situation fuelled her to seek a better career opportunity, whereas her colleague left the industry for the same reason. Thus, two different individuals responded differently to the same influence of bullying. An individual's cognitive mechanisms and actions are integral to their participation as they lead to the individual experiencing an influence differently. It has been suggested that people with higher coping efficacy may perceive fewer barriers and greater supports in their environments (Lent et al., 1994).

Although an 'influence' is dependent on both the causal capacity of the environment and the individual, the individual's causal contribution is central to their participation. As Archer (2000) suggests, "conditional influences" may not in themselves be "determinates of human action" (p. 131). A crucial point is that women are not to be held entirely responsible for their participation. Women are not responsible for the constraints, such as gender stereotypes, they encounter in their environment. Neither are women passive recipients; rather, through their responses, they play an active role in the subsequent effect of the environmental influences.

6.1.2 FRAMEWORK 1 (THE GUIDING ANALYTICAL FRAMEWORK): E, P, AND I

As Section 3.1 introduced, Framework 1 constitutes an analytical framework developed from a review of previous research in the domain. The framework comprises three categories: 1) Environment (E), 2) Person (P) and, 3) Interaction (I) between E and P. As the findings revealed in Section 5.2, the refinement of the Environment (E) category led to the conceptualisation of four dimensions (social, cultural, mediated, and resource-related), and several properties (including language, practices and media) within these dimensions. The Person (P) category included one dimension of the social identity and two key properties (gender and occupation). These dimensions and properties describe the characteristics of the Environment and Person that may influence women's participation in the DCI. In addition, the description of the Environment (E) and Person (P) sensitises the researcher to the interactions between them. However, as the findings in Section 5.2.3 revealed, the researcher reached an analytical impasse to further refining the Interaction (I) category when using an inductive logic during data analysis. This impasse was resolved by drawing on the ontological underpinning of Critical Realism which directed the research approach to describe events. This led to specific events of interaction being identified.

The analytic process of employing Framework 1 culminated in the formation of two conceptual models. As discussed in Section 6.2.2, the first model, the *Sphere of Influence (SoI)* model, helps to describe the E and P influences. The second model, entitled the *Events of Interaction (EoI)*, helps to describe the interaction between the E

and P by illuminating 10 events that may influence women's participation (as discussed in Section 6.2.3). These models build on, and extend, previous research that has considered the research problem of women's participation. **The development of these two models is a major contribution of the research.**

TEMPORALITY

The discussion of Framework 1, and the resulting models, would at first appear to entail a consideration of the three categories (Environment, Person, and Interaction). However, it emerged early in data analysis that the theme of 'temporality' arose across all three categories. Participants often suggested that influences manifested in their past, present, and future experiences. Accordingly, 'temporality' is discussed here prior to subsequent discussion of the Environment, Person, and Interaction categories.

As the findings in Section 5.2.1 showed, both the female interactive content creators and the stakeholders attributed historical characteristics of the environment as a possible influence on women's participation. For example, participants noted historical events of an economic nature—such as the dot.com bust in 2001, and the GFC in 2009—and attributed their current low salaries and limited employment opportunities to such events. The influence of the dot.com event on new media workers has been noted in previous research by Christopherson and van Jaarsveld (2005). Similarly, Trauth et al. (2008) noted that in the US, fewer women than men returned to employment in the IT field following the recovery of the “dot.com era” (p.9). Thus, history or historical events may be an influence on women's participation.

As Section 5.2.1 presented, women's participation varies over their individual life span stages. For example, participants suggested that gaining confidence with computers at an early age has the causal effect of a greater self-efficacy in later years. As occupational efficacy and job preferences are formed at a surprisingly early age (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001), inequitable access to computer games may give males an unfair technological familiarity with both software and hardware from a very young age in comparison to females (Huff, 2002, p. 112). Thus, not having access to resources in early life stages may influence women's participation in later life stages.

Adopting a lifespan perspective not only identifies participants' past experiences but also their future decisions that may influence participation. For example, a majority of the women in the study perceived the future event of having children as a possible constraint on participation. Even though only two participants had children at the time of the interviews, several others suggested they would need to leave the industry *“in the future when I have kids”* (M7). A perceived incompatibility between future work and

parenting responsibilities may, as Bandura (1997) suggested, lead to participants ‘selecting’ themselves out of the industry.

A lifespan perspective has been identified in related domains, including career development (Super, 1992; Lent, Brown, & Hackett, 1994) and, more recently, in the ICT domain (Griffiths, Keogh, Moore, Richardson, & Tattersall, 2006). Agency theorists, including Giddens (1993), also recognise “life course” (pp. 27, 82). The research surrounding women working in the ICT industry has recently focused on a life course perspective, recognising that metaphors such as the ‘leaky pipe’ may require revision (Castano & Webster, 2011). A lifespan perspective can provide both a general orientation for research, and add richness to insights by identifying causal relationships and also foster holistic insights as it connects past, present and future influences.

The empirical data indicated that influences on women’s participation may also emerge serendipitously through the emergent interaction of E and P within a situated but dynamic context. For example, although one participant had an interest in computers *“most of her life”* (G2), it was not until she met games workers in the coffee shop in which she worked that she considered a career in the games industry. Had those circumstances not eventuated, she indicated that she might not have entered the industry. Agency theorists such as Bandura (1997) emphasise emergent aspects of interaction and the role of serendipity. Similarly, even though Critical Realism recognises that history may lead to certain structures predating actions (Archer, 1995), emergent interactions remain central—even social structures and systems themselves are emergent entities (Archer, 1995; Willmott, 1997; Wikgren, 2005). In part, this inclusion of a temporal aspect addresses the need recognised in Chapter 2 for the relational analysis of influences.

THE ENVIRONMENT (E) INFLUENCES

As the findings in Section 5.2 indicate, the Environment (E) category within Framework 1 was refined during data analysis to include four dimensions: 1) social, 2) cultural, 3) mediated, and 4) resource. Analysis revealed that within these four dimensions are a number of properties such as social agents, language, and specific media and resources. These dimensions and properties, as characteristics of the environment, can influence women’s participation. This section discusses the four dimensions in reference to the empirical findings and extant literature.

1) THE SOCIAL DIMENSION

The *social dimension* illuminates the social characteristics of the environment that may influence women’s participation within the DCI. There are two key properties in the social dimension: 1) social agents (including parents, siblings, teachers, peers,

employers and colleagues); and 2) social settings (including family, education, work, and communities of practice). Findings indicate that social agents are those people that a participant may interact with in a face-to-face situation (such as family, friends and colleagues), and those with a greater distal proximity (such as role models). Findings support previous research that identifies people who can influence women's participation; for example, fathers (Barker & Aspray, 2006), mentors in education (Ahuja, 2002) and workplace contexts (Tapia & Kvasny, 2004), and teachers (Adya & Kaiser, 2005) in the education context. In the wider literature, *SCT* recognises socialisation agents such as mother, family, teachers, and peers are important role models (Bandura, 2002b, p. 282).

Participants' accounts revealed that certain social agents manifest in different social settings or contexts; these social contexts can be positioned along a typical lifespan perspective (See Figure 21). Social agents such as colleagues are more likely to manifest in the social setting of the workplace, and parents (in particular, fathers) are more likely to manifest in the family setting. Similarly, Giddens (1993) recognises that social agents such as "family" in childhood, and peer groups in "later stages of an individual's life" (p. 76) manifest in different "contexts of interaction" (pp. 78-79), including schools, the mass media, and workplaces. Findings reveal that participation in a community of practice, such as the online game *World of Warcraft (WoW)*, could foster participation. These CoP could manifest alongside other social contexts. For example, an individual could be a student (education context) and also a member of an online gaming CoP. The value of both formal and informal CoP has been recognised by Wenger, McDermott and Synfer (2002). Further investigation of CoP is warranted.

There is scope for further refinement of the findings. Although findings did not identify the family as being an influence in later life stages, it is likely the influence of family may extend over a lifespan perspective, from the influence of parents in early childhood through to the influence of children and spouses in late education and career stages. The findings identified family as being most salient in childhood and early education; this may be because children are more likely to be influenced by their parents and that adults have a stronger sense of self and are consequently less likely to be influenced by their spouse or child. However, family in all likely hood may be best presented as a continuum over a lifespan. This an area for further research development.

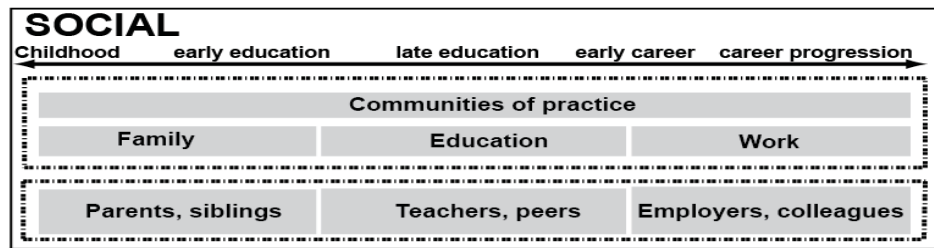


Figure 21: Social settings and agents in the social dimension from a lifespan perspective

Social agents, such as family members, could be an influence on participation because they could reduce the effect of social stereotypes. For example, Participant G3 (the AI programmer) attributed her participation to her parents not holding or teaching her stereotypes about women's capability. Conversely, parents could reinforce stereotypes. For example, a participant remarked that women may not imagine themselves using technology when parents reinforce stereotypes during childhood when they *"buy the son a computer and the girl a piano"* (G2). These are similar findings to previous research, which recognises that family members play a role in interpreting and encoding external influences by reducing the salience of gender stereotypes (Oswald, 2008, p. 201). In the IT context, these stereotypes influence the career decision of girls and women (Clayton, von Hellens, & Nielson, 2009). Thus, social agents such as parents influence women's participation in the DCI by conveying or challenging social stereotypes pertaining to gender.

Social agents, such as role models, can manifest across different social settings. However, findings also reveal that participants encounter a paucity of role models in childhood, education, and career contexts. Women's inequitable participation in the ICT industry has been attributed to a similar paucity of role models in that industry (McGrath-Cohoon & Aspray, 2006), and in education contexts (Thomas & Allen, 2006). Role models are critical for girls (Newmarch, Taylor-Steele & Cumpston, 2000; Güreş & Camp, 2002; Beekhuyzen & Clayton, 2004; Adya & Kaiser, 2005), and for women in the IT industry (Tapia & Kvasny, 2004). Thus, findings identify similar influences to those identified in previous research in the ICT and DCI contexts. However, as discussed in Section 6.2.5, theorists such as Bandura offer further explanation of the influence of role models.

2) THE CULTURAL DIMENSION

The *cultural dimension* illuminates cultural characteristics of the environment that may influence women's participation, such as language, customs and practices, and historical conditions. Although participants made numerous references to how culture could influence their participation, there were fewer insights to what culture entailed. As Layder (1998) notes, there are differences between a participant's colloquial use of the

term ‘culture’ and the manner in which the researcher may further interpret the term when drawing on extant theory or concepts (p. 91). The researcher’s interpretation of the term ‘culture’, and her understanding of how it can influence participation, is assisted by drawing on extant literature.

Even though the term ‘culture’ is one of the “most widely” used concepts in sociology (Giddens, 1993, p. 31), it is a difficult and complex concept to describe. Indeed, culture is one of the most complicated words in the English language (Williams, 1983), with anthropologists advancing more than a hundred definitions (Berger, 1995). It is often suggested that culture involves values, norms, and beliefs; however, there is “wide-ranging and contradictory scholarly opinion” about these concepts (Straub, Loch, Evaristo, Karahanna & Strite, 2002, p. 13). Hofstede (1993) proposed that culture involves a shared cognitive framework; however, an exclusive focus on cognitive components can have shortcomings (Sackmann, 1992). Culture has a multi-levelled nature, including national culture (Trauth, Quesenberry & Huang, 2008), organisational culture (Allaire & Firsirotu et al., 1984) and everyday situated contexts (Weisinger & Trauth, 2003); it can also be inclusive of practices such as how members dress, patterns of work, leisure pursuits, language (Giddens, 1997), and physical arrangement of the environment (Kappos & Rivard, 2008). Although the concept of culture is complex, there is value to the effort of trying to understand it (Schein, 1985).

The findings indicate that cultural influences manifest in different ways, at different levels (macro and micro), and in different micro contexts. Culture differed across organisation types; for example, government (public), private, start-up, or multi-national. The definition of ‘private’ and ‘public’ sector organisations is taken from Sethibe, Campbell and McDonald (2007) who also noted there has never been an easy delineation between the two. There were few examples of macro level cultural influences in the participants’ accounts. There was evidence of what can be described as “subcultures” (Hofstede, 1998; Walsham, 1993). For example, a participant described how the shared interest in pirates by a group of people in her organisation contributed to a ‘nice culture’. A description of the ‘ratio’ property draws to attention the fact that DCI organisations often had a male majority which, in turn, could lead to male orientated practices—a “*boys club*” culture (S1, G3). Research in ICT-related literature suggests that the ‘boys club’ can impede women’s participation in ICT (Margolis & Fisher, 2002; Morgan, Quesenberry & Trauth, 2004). Similarly, research in the DCI by Roan and Whitehouse (2007) suggests that an “all-male environment was *not* a problem” [emphasis added], but it did offer a “different dynamic” and some “different issues” for the most part, as male colleagues can “fear” that women “won’t fit into their [male workers’] culture” (p.27).

Findings also show that cultural properties are evolving and dynamic. The dynamic nature of culture is evident when we consider the practice of working long hours. Although the participants worked on average a flexible, forty-hour week, several women identified that there was an expectation within the industry to work long hours at some point, and this practice could be an influence as it affected life/work balance. Extant literature supports this, reporting a culture of long hours in the DCI (Gill & Pratt, 2008; Perrons, 2003b) and the ICT industry (Griffith & Moore, 2010). However, it is not enough to suggest that ‘long hours’ may influence participation, but to consider how this influence differs over time. Findings reveal that ‘cultural’ practices, such as working long hours, can vary among different contexts, different times of participants’ lives, and among participants.

There are different reasons why the practice of working long hours manifests. Individuals may work long hours as a result of environmental characteristics, such as economic conditions or management practices within the workplace, that lead to a ‘crunch time’ towards the end of project cycle. Although working long hours may be driven by the individual (who is driven to produce excellence in their work for intrinsic reward), this influence can vary at certain points of women’s careers. For example, when they first start their careers or need to learn a new skill, they are more likely to invest more time. Some participants made the point that they actively made the choice not to work long hours in an effort to maintain a life/work balance, regardless of there being an unwritten expectation that they would stay back like their colleagues. Thus, a cultural influence, such as the practice of working long hours, is not a fixed entity: both the environment and person have a causal role to play.

Perrons (2003b, 2005) suggested four main reasons why people work long hours: the unpredictable nature and flow of work; uncertainty associated with a business start-up; the need to continually update skills and knowledge; and the intrinsic satisfaction derived from the work itself. Reeves (2001) proposed that working long hours may reflect workers’ preferences; however, Perrons (2003b) criticizes the fact that the demands of childcare are not considered in this suggestion by Reeves. Influences such as maintaining a “work–life balance” have been identified as a negative influence on women’s participation in the DCI (Perrons, 2003b) and ICT industry (Moore, Griffiths & Richardson, 2005b). However, the practice of “work-life balance” is changing, as “quality of life has now become a term in the industry, and it was never a term before” (Consalvo, 2008, p. 344)⁸⁵ Culture is, as Schein (1985) suggested, a dynamic, cumulative entity formed over time.

⁸⁵ Game designer and Professor of Games Studies

3) *THE MEDIATED DIMENSION*

The *mediated dimension* illuminates the influence of the media on women's participation. The analytic category does not suggest that media is influential in a direct way, as might be suggested by an effects model. Rather, in response to criticisms of such models (Gauntlett, 2001), this investigation adopts Silverstone's (1999) approach that media can involve 'a process of mediation', thus acknowledging the links between the person and their environment.

The findings identify that the environment presents women with different forms of media to interact with, including television and the internet. Previous ICT and DCI-related studies have identified the influence of media on women's participation. In the DCI; these media include TV, advertisements (Gill, 2006), games content (Jenkins & Cassell, 2008), and in the ICT context these media include magazines (Margolis & Fisher, 2002). Similarly, agency theorists recognise the influence of electronic technologies (Bandura, 2001; Bandura, 2002a; Bandura, 2002c), and television (Giddens, 1993). However, as Lang (2007b) laments, although the media is assumed to be a powerful factor in women's participation in the ICT industry, there is little data to support the assumption, and its influence is under-investigated.

Mediums such as television perpetuate inaccurate gender and occupational stereotypes of women. So much so, that it left one participant feeling "shocked". Secondary data supports the finding that gender stereotypes manifest in popular television programs related to ICT and DCI. For example, *The IT Crowd* (a U.K. Channel 4 television program) features technology savvy 'geeky' men and technologically inept women. These insights are similar to those from previous research, which suggested that "media images more frequently depict computer programmers and developers as males and women as users" (Barker & Aspray, 2006, p.38). Mediums such as television can offer women role models (Consalvo, 2008, p. 180), albeit fictional role models. Appropriate role models on television have been linked to a "remarkable shift" (that is, increase) in women's participation rates in other industries, such as veterinary science (Craig, 2004, p. 9). Participants in this investigation identified the paucity of suitable female role models. Secondary sources of data indicate that sexist advertisements in gaming magazines may contribute to the low level of female readership which, this investigation proposes, may curtail women's access to information.

Nearly half of gamers are female. However, very few of them read gaming magazines. But what do you expect when you open the latest gaming magazine to a voluptuous blonde with a hardhat and a white cut-off halter-top..." (Appendix 17, Item 25)

Extant literature argues that women's involvement in the design process leads to product diversity which then leads to attracting more women as both users and creators; however it is not clear how. If there were more games that appealed to girls and women this might lead to more women in the industry (Jenkins & Castells, 2008); this reflects Fullerton et al.'s (2008) concept of the "virtuous cycle". Secondary data supports this notion that more women playing games may lead to more women in the industry. If there's no games you like, you're not going to become a game developer" (Appendix 14, Item 28 -M, 19, White, HS, Australia). However, Consalvo (2008) argued that there is "no evidence" to support the notion that diversifying content encourages more women into the industry (p. 177). Similarly, comments from the industry question whether having more women in the industry would change the type of content in games.

Many games that are made specifically for girls involve role models that are insulting to parents and children. [Not that there are good role models in boys' games.] Would this change if there were more women? Possibly, possibly not. (Appendix 17, Item 28-M, 24, White, disabled, Uni, Canada)

Previous research suggests other mediums, such as games products, may not appeal to women because they perpetuate stereotypes or promote violence (Jansz & Martis, 2003; Jansz, 2005; Ivory, 2006). Findings indicate that games content targets men. A participant explains: *"We know who our audience is and we do target them. We target them by having hot chicks with big breasts and scantily clad"* (G6). Participants did suggest that games products may become less stereotypical with a greater number of women entering the DCI workforce: *"As more women do filter through to the industry"* (G6), and games are marketed to the *"non-traditional gamer"* (S1).⁸⁶ However, participants did not see such content as a barrier and happily admitted they played violent games. Other influences— such as the positive social experience that accompanied the playing of games or the opportunity to develop game play skills—fostered participation. This finding highlights the complex interaction between the environment and the person influences; and that more than one influence may be at play at any one time.

4) **THE RESOURCE DIMENSION**

The *resource dimension* illuminates the resources that may influence women's participation. As Section 5.2.1 introduced these resources include information, technology and people. There is a distinction to be made between influences in the mediating dimension and those in the resource dimension. A magazine may be a resource when it provides industry information. However, when the content of the magazine conveys stereotypes about a social identity, it then becomes a mediating influence. For

⁸⁶ Examples of such products include *Nintendo Brain Power*

example, the gratuitous use of scantily clad females in industry magazines would position the magazine in the mediated dimension.

Participants noted the importance of access to resources, such as computers and magazines. Access to resources, such as computers, in early childhood fostered skill development. For example, a participant (with access to a computer at home) taught herself programming from a magazine at the age of eight. Access to resources was also important later in life; for example, a participant described how she kept up to date while on maternity leave because she had a computer and industry software at home. Many of the resources the findings identify have been noted in previous related studies. For example, computers have been identified as important resources for school-aged girls (Beekhuyzen & Clayton, 2004) and women working in the ICT industry (Tapia & Kvasny, 2004). In the DCI, Perrons (2003a) identified that new media employees engage in self-learning via magazines and the internet.

The interrelatedness of influences is evident when we consider that information resources could be facilitated by technology resources such as the internet. For example, a participant identified that, although her school provided little relevant information regarding DCI careers, she actively sought information from game development websites such as gamedev.net, and gamasutra.com. This finding highlights that there is an interaction between the environment and person influences.

THE PERSON (P) INFLUENCES

The Person (P) category in Framework 1 was refined during analysis to include the dimension of social identity, which in turn included two key properties (gender and occupation), and two further properties of ethnicity and age (as presented in Section 5.2.2). These characteristics of the person can influence women's participation. This section discusses the relevance of this finding in light of previous research regarding the phenomenon.

1) THE SOCIAL IDENTITY DIMENSION

The *social identity dimension* illuminates the characteristics of the person that can influence their participation. As Figure 22 illustrates, the Person category in the original analytical framework was refined to include one dimension, that of social identity. Within the social identity dimension are four properties: 1) gender, 2) occupation, 3) age, and 4) ethnicity. It was interpreted that a person's social identity is the identity by which a person is most readily recognised and (possibly) judged.

Social identity is closely linked to stereotypes and social norms surrounding that identity. As the findings suggest, participants' accounts revealed they were aware of the social norms and stereotypes surrounding their gendered and occupational identity. The

findings suggest that social identity may influence a person's interaction with the environment by fostering certain types of experiences, or by experiences. This difference in experience occurs as a result of how other people interact with an individual's social identity, and how the person responds to that social identity.

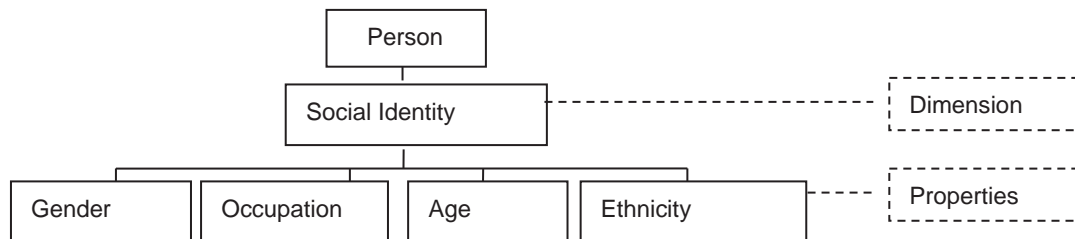


Figure 22: Extending the person category

The term “social identity” can be further explained by drawing on Hogg and Terry (2001) who described the social identity of a person as referring to the “social category (for example nationality, political affiliation, organization, work group) within which one falls, and to which one feels one belongs, and provides a definition of who one is in terms of the defining characteristics of the category – a self-definition that is a part of the self-concept” (p. 3). Thus, social identity appears important at the individual level, manifesting as both self-concept, and a sense of belonging to a group. However, in this investigation, social identity also involves the individual recognising the identity that others see them as, and the stereotypes associated with that identity. Thus, the concept is also similar to second order expectations which, as Webster and Whitmeyer (1999) described, entail people responding to the perceived social expectations of others.

Although findings focus on social identity, identity is a complex and debatable construct and may have several further elements or properties that these findings have not revealed or explored in any depth. It may include aspects such as: national identity (reflecting cultural characteristics); psychological identity (including traits and personality); personal identity [which Trauth et al., (2004) propose is formed primarily through a human's own sense of meaning]; biological identity (age, health characteristics); and organisational identity [which itself consists of personal, interpersonal, and collective aspects (Brewer & Gardner, 1996)].

Indeed, a Critical Realist approach views the human as a “stratified being” (Archer, 2000, p. 306), and recognises a number of levels of identity—such as biological, personal, social, and cultural—as a constitutive element of a person's identity. Critical Realism requires that these levels remain analytically distinct to avoid the conflation that occurs when a person's capacities at one level, such as psychological capacities, are

linked to biological capacities (Archer, 2000; Wikgren, 2005); for example, where a woman's 'personal' capacity for leadership is founded on her 'biological' characteristics.

The focus on social identity, in contrast to other identities, may have resulted from the methodological approach, which encouraged group level insights—in this case, insights about women. Participants were asked about their personal experiences (individual level), and about the influences on women's (group level) participation. A different methodological approach may have illuminated other aspects of identity. Further investigation of the person category and the dimension of social identity is warranted.

GENDER AND OCCUPATIONAL PROPERTIES: A DIFFICULT TENSION

As the findings reveal, the social identity of female DCI workers comprises two key properties: 1) gender, and 2) occupation. Participants recognised their individual capabilities were often judged against pervasive stereotypical notions of women's capabilities. Gender being one of the most pervasive ways by which we categorise people (Stangor, Carr, & Kiang, 1998). Previous research reports that gender stereotypes ascribe assumed masculine or feminine traits and capabilities, regardless of the person's individual qualities (Cejka & Eagly, 1999). Participants also recognised that the occupations in the DCI were strongly associated with technical skills. Previous research also suggests that the DCI values technical skills for development roles (Whitehouse & Diamond, 2005). Findings reveal that women face gender stereotypes that suggest they do not have the technical skills suitable for technology-related careers.

Participants faced the task of reconciling a difficult tension between the gender and occupational properties. Previous studies reflect similar identity tensions: with young women who were training to be IT teachers (Lloyd, 2009); with women in IT who face dualisms such as 'Home and Work' (Beekhuyzen et al., 2003, p.77); and between 'southern belle' and the IT worker (Trauth et al., 2008b). Previous studies provide less insight into how women respond to such tensions.

There are several entry points into further investigation of the tensions between gender and occupational characteristics; these are: a) gendered skills (skills that are attributed to genders); b) girly girls and geeky guys (gender stereotypes that suggest women lack technical proficiency); c) passion and technical capacity (gender stereotypes that suggest women are less passionate than men); d) the in-between gender (women's distancing from gender stereotypes); and e) gender triggers (the circumstances that heighten the tension between gender and occupation).

a) Gendered skills

Previous research reports that women face occupational segregation in the ICT industry because certain skills are associated with a particular gender. Traits traditionally associated with women in the ICT industry include emotional labour (Lewis & Simpson, 2007, p. 8) and communication skills (Lippa, 2002, p. 24); this has led to the feminization of certain IT careers (Joshi & Kuhn, 2005; Cejka & Eagly, 1999). Even ICT industry surveys, such as the 2010 ACS *Women in the Industry Survey*, ask questions about participants' use of soft skills (See Appendix 17, Item 41).

Findings suggest that women in the Australian DCI face occupational segregation. As the findings reveal, women were associated most strongly with 'soft skills' and administration and project management roles, and not with the technical skills required for programming or production roles. Future research could investigate the occupational segregation women face in the Australian DCI.

b) Girly girls and geeky guys

Previous research suggests that technical proficiency in the DCI has been traditionally seen as involving programming (Roan & Whitehouse, 2007). Even roles that require artistic skills are seen as "a complement to underlying technical abilities rather than hybridisation" (Roan & Whitehouse, 2007, p. 31). Findings reveal that these technical skills are strongly associated with 'geeks', a term describing both an expertise in an area and an unflattering persona (for example, unsociable, friendless). The findings indicate that the most 'geeky' roles were technical roles involving programming and that these roles were overwhelmingly associated with male workers. It appeared that the gender stereotypes led to women, particularly those in technical roles, questioning their capability with regard to technical skills. The women who were not technically skilled were referred to by a participant as 'girly girls'; this double emphasise on gender highlighting that women were not associated with technical ability. Women in technical roles (such as programming) faced the greatest challenges regarding stereotypes; this may explain why there were few female programmers in the industry.

Previous studies also identify that it is very uncommon to have a female programmer in the DCI (Roan & Whitehouse, 2007). Perhaps, as research regarding women in the ICT industry suggests, women face influences that can cause them to question their skill capability (von Hellens, Nielsen & Trauth, 2001, p. 118), and lower their self-efficacy towards technology use (Betz & Hackett, 1997). Technology has been inherently associated with "men's work" (Trauth, 2002, p. 10), and the mastery of skills is traditionally seen as a masculine trait (Turkle, 1995; Wajcman, 1991, 2000).

Similarly, secondary sources of data support the belief of women in the ICT workforce that “a huge technology component [...] means: mostly men” (Appendix 17, Item 31). Consequently, those women working in technology-related roles are somehow “different” because they are going against society’s impression of what a female should be (Turkle, 1995, p.56). In the IT sector, stereotypes contribute to an environment where women are regarded as “other” to the norm (Lang, 2007a, p. 218).

Many of these beliefs are based on misconceptions, such as the notion that women’s cognitive capacity for spatial reasoning limits their capacity in technical roles. Hyde (1990) suggested that such beliefs are myths and any “gender differences in cognitive abilities are generally not large” (p. 72).⁸⁷ Future research could investigate the stereotypes that female DCI workers, in particular programmers, face in regards to their technical capabilities.

The findings from this investigation suggest that there is some ambiguity about what constitutes ‘technical ability’. Participants often suggested that their roles were not technical, when the term ‘technical’ surfaced in the interview; however, their roles clearly involved technical skills related to technology. For example, the senior character artist in a games organisation utilised software such as *Photoshop* and *Zbrush*, and a social media coordinator required skills in online communities such as forums, blogs, Twitter, and Facebook. The data indicates that even those women in roles more closely aligned to administrative or managerial positions, drew on, and indeed took pride in, their technical knowledge.

Women’s participation in the DCI may be constrained because the DCI does not clearly communicate the diversity of roles available, and thus carries the burden of the mis-informed stereotype that the industry only involves programming. Complicating this matter is the rapidly changing nature of the skills required of the emerging industry. As one stakeholder (who was a member of a peak industry body) noted, not even the industry could define clear career roles or pathways. Future research could investigate the stereotypes surrounding technical capability in DCI occupational roles.

c) Passion and technical capacity

Being passionate, was an attribute a majority of participants identified as important for DCI occupations. Indeed, both a participant and a stakeholder, who were responsible for hiring workers, suggested an applicant’s passion was the deciding factor in the hiring decision. Previous studies support this notion that passion is a key

⁸⁷ There are some gender differences in one type of spatial ability, mental rotations, and mathematical performance. These were not statistically different. Hyde (1990) highlighted that trait ascription approaches have been challenged historically; for example, Wooley’s expose, in 1910, of the misconception that the smaller brain size of females negatively influences their cognitive ability. Wooley (1910) referred to the research of the time as “drivel and rot” (Hyde, 1990, p. 57).

characteristic of new media workers (Consalvo, 2008; Gill, 2002). However, the findings from this investigation indicate that women were likely to be perceived as not being passionate. Although participants were not able to clearly define ‘passion’, it appeared to manifest as a result of early experiences with technology, such as playing games. There was a suggestion that, as games content might not appeal to young girls, they would not have had experiences with technology; this then led to their being perceived as not being passionate about technology. However, as Section 6.3.3 discusses, the women in the current study emphatically felt that they were passionate about their occupations and that such passion could manifest in a number of ways. Future research could investigate gender stereotypes that suggest women, in contrast to men, are not as ‘passionate’ about technology. In doing so, there is a need to further investigate what ‘passion’ entails.

d) The in-between gender

Previous research suggests that women in IT see themselves as “different” to other women (Griffiths et al., 2005, p.12), where these other women are ‘typical’ women. This distancing may be the result of male-orientated culture where women are forced to fit into masculine cultures. In previous ICT research, it is suggested that “Female IT workers are faced with two choices: either to masculinize themselves and ‘fit in’, or to challenge the cultural system and attempt to feminize the workplace” (Tapia & Kvasny, 2004, p.87).

Participants’ accounts indicated that some women distanced themselves from the stereotypical female identity. Participants described themselves as not being like other women, they were, not ‘girly girls’, not interested in makeup, not *“a particularly feminine kind of person”* (G7), or a *“standard girl”* (G6). This distancing from being ‘girly’ surfaces in secondary sources, where, for example, a *Girls’ Guide to Gaming* explicitly states it is not “girly” (Appendix 17, Item 8).

However, unlike previous research that suggests that women can only respond in one of two ways to a male-orientated culture –by masculinising or feminising–findings from this investigation indicate that women in the DCI take an ‘in-between’ stance. The findings reveal that a majority of participants had a weaker gender identification, and positioned themselves as neither a ‘girly girl’ nor ‘one of the boys’; rather, they were *“in between genders”* (M2). The finding supports previous research that has suggested women may be constructing a middle ground in regards to gender stereotypes. Data from a 2002 study at Carnegie Mellon, for example, noted a “transitional culture” in which some of the female participants “seemed to be constructing a new identity that was both ‘geeky’ and feminine” (Blum & Frieze, 2005, p. 112) –with ‘geeky’ being linked to the masculine. Previous studies in the ICT field suggest fixed notions of gender are difficult

to support. Trauth (2002) drew on Wajcman (2001) who suggested that across different cultures “there is no behaviour that is universally associated with masculinity or femininity” (p. 101). Furthermore, traditional notions of gender stereotypes are possibly changing with the younger generation (Trauth et al., 2010). Perhaps, as Bury (2011) suggested, female geeks need to be understood as a hybridized alternative feminine identity. Further research regarding women’s responses to the tensions between gender and occupational identity may be warranted.

e) Gender triggers

Although participants’ accounts indicated they could manage the gender stereotypes they faced, tensions arose when the environment presented circumstances where gender triggers were activated. Gender triggers are situational cues that prompt divergent responses from men and women within specific situations (Bowles, Babcock, McGinn, 2005). An example of such a gender trigger is evident in the inequitable male to female ratio in the DCI organisations. Several participants noted that being in the gendered minority in the workplace made them feel isolated and different. Similarly, previous research in ICT suggests that being in the minority can leave women feeling like the “odd girl out” (Trauth, 2002), and as being “treated differently” (Consalvo, 2008, p. 188). Being in the minority can lead women to being evaluated first by their gender, and then by their ability (Valian, 1998); and being the solo woman in a group heightens gender stereotypes (Oswald, 2008, p. 201) which may have a potentially negative effect on performance (Bandura, 1997).

Participants found that working in a male majority environment was manageable, until an event or situation triggered the women into feeling as though they were treated differently because of their gender. For example, participants felt like a ‘girl’ when a male colleague restrained from swearing in front of a female DCI worker; this then made her feel different and led to her self-doubt about her technical ability. Future research could focus on the events and circumstances that trigger the tensions women experience in regards to gender stereotypes.

AGE AND ETHNICITY PROPERTIES

In addition to the two key properties of gender and occupation, findings reveal that age and ethnicity may also be, to a lesser extent, characteristics of social identity. Participants perceived the DCI as being a young person’s industry; indeed, participants ranged from 22-34 years of age. These findings support Gill’s (2002) observation that one of the main attractions of the DCI is its image of “youth” (pp. 28, 78). DCI workers can challenge traditional career progression pathways. Although age may mean seniority in a traditional workplace, in the games industry, a forty-year-old may be retraining to

enter the newly emerging industry, while an eighteen-year-old already has several years' experience in an upper management role or, as one participant suggested, as a "garage CEO".⁸⁸ A tension between age and occupational identity appears to manifest for older workers who are in the minority within the workplace. One 30 year old participant described herself as being "old" and of not "connecting" with her "20-something" colleagues (G1). Influences can manifest as the DCI workforce ages. Life/work balance may not have been an issue *"at the age that they're looking at these roles"* (that is, in their early 20s); however, *"in the older age groups"* (S3), commitments such as parenting surfaced. However, there is little research regarding the influence of age on the participation of workers in the DCI.

Findings also reveal that ethnicity may be a characteristic of the social identity. One of the two female programmers was from an Asian background; the other highlighted that, of her female Computer Science classmates in a Canadian university, a majority of the women were from an Asian background: *"In computer science there was definitely a higher percentage of male students; most of the females were exchange students from Asia"* (G3). Previous research identified a "striking predominance (around 40%) of Asian females among all female IT students in Australia" (von Hellens & Nielson, 2001, p. 50). However, it is unclear if there is a similar pattern in the DCI. The international IGDA survey (2005a, b) identified ethnic people, along with women and people with disabilities, as minority groups within the games industry⁸⁹.

It has been proposed that Asian women may pursue certain careers due to cultural influences; specifically, to their Confucian family values and social expectations (von Hellens & Nielson, 2001). However, as the findings (presented earlier on p.162) highlighted that, although ethnicity may be a characteristic of the person, their participation is not necessarily due to cultural influences alone. Rather, certain ethnic groups entered the IT career pathway as a result of Australia's migration policies. Thus, it may well be a combination of influences such as cultural heritage and migration policies that lead to the higher number of female Asian students participating in IT studies in Australia. This finding illuminates the fact that influences on women's participation must be considered in a relational manner. Future research may consider how the different properties of social identity (such as age, gender, occupation, and ethnicity) can filter or influence participation experiences.

⁸⁸ A garage CEO is a person who has given themselves the title of Chief Executive Officer of a company they operate from a home or a garage. The term can suggest illusions of grandeur but also has some credibility as several successful business people in IT started their own business in this manner.

⁸⁹ The IGDA Diversity report identified a greater number of respondents self-identifying as 'disabled' than as 'women'.

6.1.3 OUTCOME: SPHERE OF INFLUENCE (SoI) MODEL

As the findings in Sections 5.2.1 and 5.2.2 reveal, the refinement of the E and P categories in Framework 1 led to the identification of a range of properties, within four dimensions of the environment (social, cultural, mediated, and resource-related), and one dimension of the person (social identity). These analytical refinements presented in the findings result in the development of a model entitled the *Sphere of Influence (SoI)*, as illustrated in Figure 23.⁹⁰

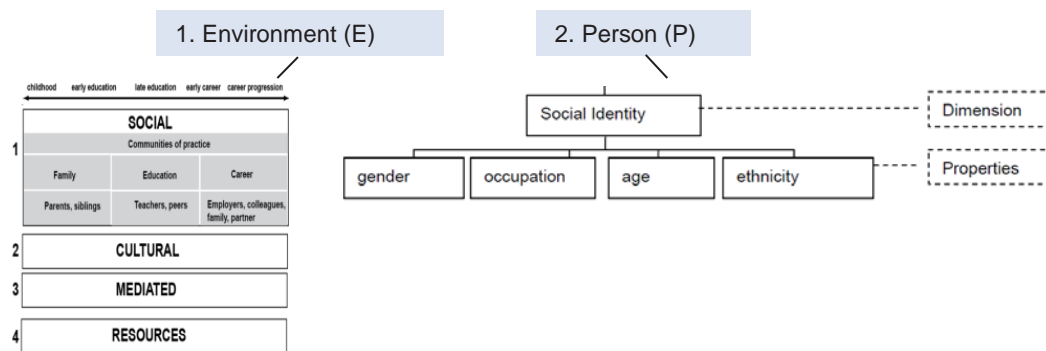


Figure 23: Refinement of the first two categories in Framework 1 resulted in the *Sphere of Influence (SoI)* model

There are five key strengths of the *SoI* to consider when evaluating its value for understanding the phenomenon of women's participation in the DCI. These strengths include 1) the primacy of empirical data, 2) the linkages between macro and micro levels, 3) a temporal perspective, and 4) a non-essentialist approach to gender, and 5) its potential as a sensitising device for future research. Although the *SoI* does not specifically include the analytical category 'interaction', the model does begin to sensitise the researcher to the interactions between the E and P.

1) The first strength of the *SoI* is that it emerges from, and values, the empirical data. The primary empirical data stems from the insights of the female interactive content creators. Understanding the experiences of participants is congruent with Critical Realist ontology, particularly with Bhaskar's empirical domain of reality. Thus, the *SoI* differs from models that emerged in later stages of analysis, including the *Events of Interaction* and the *Five Acts of Agency*, which recognise influences that are not readily identifiable by participants.

2) A second strength of the *SoI* is that it encourages a relational view of influences. Even though the dimensions and properties in the *SoI* are presented as distinct analytical categories, the findings reveal that there are linkages between the dimensions

⁹⁰ The title of the model emerged from what Layder (1998) might call a "key interview" (p.71), where a participant described her male colleagues' 'sphere of influence'.

of the environment (social, culture, mediated, and resource-related), and across both micro (the immediate or situated setting, such as the organisation or workplace), and macro (the wider social setting) contexts. However, further investigation of properties is warranted.

3) A third strength of the *SoI* is that it encourages the viewing of influences from a temporal perspective, by including an individual's lifespan and historical events (as Table 48 illustrates); this, in turn, fosters a unified and holistic understanding of influences.

Table 48 Examples of the temporal aspect of influences on participation

SoI Dimension	Temporal Aspect	Characteristics	Example of Influence
Cultural	1) Historical	Historical events and circumstances which manifest in society and influence an individual's participation	Affordability of technology (S2); women historically not in the workforce; recent events, for example, economic constraints, dot.com and Global Financial crises (G8)
Social	2) Lifespan	An individual's own lifespan, where personal events and experiences influence participation	Early childhood experiences with technology foster skill development (G3, M8); becoming a parent in later life can conflict with career

4) A fourth strength of the *SoI* is that the social identity dimension within the Person (P) category provides a non-essentialist approach to investigating women. 'Social identity' offers a concept midway between the individual and the stereotypes that women as a group face (as illustrated in Figure 24).

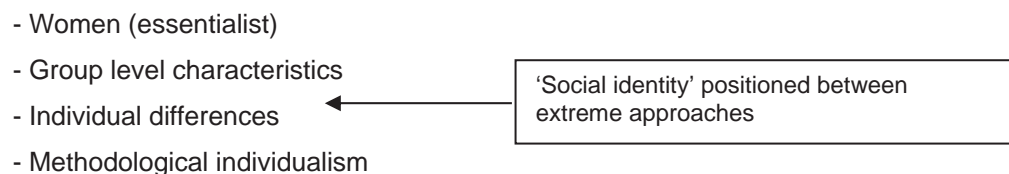


Figure 24: Positioning the analytical category of 'women' in the *Sphere of Influence (SoI)*

5) The fifth strength of the *SoI* model is that it can serve as what Giddens and Turner (1988) described as a sensitising analytical device for future research. Used as a sensitising device, the *SoI* is not a prescriptive model, but rather a tool to help identify the characteristics of E and P that influence women's participation in the DCI context. The *SoI* model reduces some of the complexity in understanding participation, by organising and unifying data. The *SoI* provides a holistic approach to understanding a diverse and potentially fragmented range of influences, rather than what might be described as 'garden path analysis'.⁹¹ Hammersley and Atkinson (1983) suggested that

⁹¹ Richards (in Bazeley, 2007) describes 'garden path analysis' by stating that the reader is taken "along a pleasant pathway that leads nowhere: 'Here are the roses, there are the jonquils, and aren't the daffodils lovely today!'"

such sensitising devices serve as a “germ of the emerging theory” (p. 180). As Turner (Giddens & Turner, 1988) explained, until one has such a scheme “that denotes and orders at the analytical level the properties of the universe”, it is “difficult to know what to theorise about” (p. 163).

Thus, the *SoI* presents a starting point for early theorisation by addressing the ‘W’ questions of ‘What, When, Where and Who’. The ‘W’ questions ask: ‘What influences exist’ (from the participants’ perspective); ‘When do the influences occur?’ (the historical and lifespan perspective); ‘Where do influences occur (for example, the environment characteristics); and ‘Who is being influenced’ (for example, the person characteristics). The importance of asking the ‘W’ questions has been noted across different research approaches, including qualitative studies (Whetten, 1989), and case study (Yin, 2003, p.5). Asking the ‘W’ questions during data analysis fosters a “thoroughness of coding”, the development of “relational statements”, and a “theoretical model” (Bazeley, 2007, p. 78). Answering the ‘W’ questions is useful in establishing the range of any theory that emerges (Whetten, 1989), as it assists in identifying the elements, concepts and relationships. For example, in asking ‘what’ influences exist, the *SoI* provides categories, dimensions and properties to organise the descriptive insights arising from the analysis of participant and secondary data. In asking ‘where’ influences manifest, the *SoI* assists in recognising the characteristics of the settings in which participation manifests—the “various conditions in which action occurs” (Grotz, 1999, p. 175), and the “settings of interaction” (Giddens, 1979, p. 207). The *SoI* does not identify determinants of participation, but rather assists the researcher to recognise the conditions, or the characteristics of the context in which participation occurs.

6.1.4 OUTCOME: EVENTS OF INTERACTION (EOI) MODEL

Developing a description of the Environment (E) and Person (P) sensitised the researcher to their interaction. However, as noted in the findings, the researcher faced an analytical challenge in further conceptualising and investigating interaction. This challenge was resolved in part by identifying ‘events of interaction’ between the environment and person, where these events appeared to influence women’s participation. As Section 5.2.3 of the findings presented, the refinement of the Interaction (I) category led to the identification of 10 events of interaction, which include gaining entry into the industry (‘Getting In’), negotiating salaries (‘The Catch 22’), and becoming a parent (‘Motherhood’).

The 10 events of interaction inform the development of the *Events of Interaction (EoI)* model (See Table 39). As Figure 25 illustrates, the initial guiding categories of E,

P, and I offered by Framework 1 have been refined through the development of the two models: 1) the *Sphere of Influence (SoI)* and 2) *Events of Interaction (EoI)*. **These two models are contributions emerging from this research.**

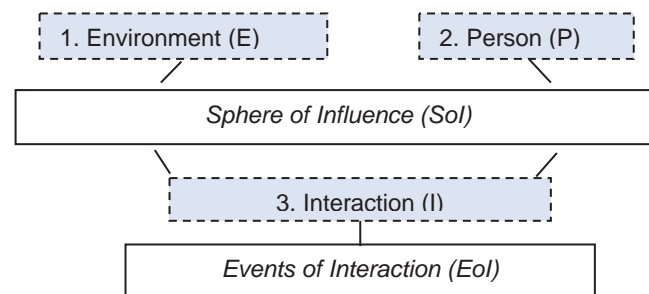


Figure 25: Development of the *SoI* and *EoI* models

There are four strengths of recognising events of interaction. First, identifying events provides one way to understand the interaction of the environment and person—an area that Chapter 2 recognised as needing a research focus. Second, recognising events involves analysis of subjective accounts and objective insights (as inferred by the researcher). This researcher inference can identify events not readily articulated by participants. For example, a participant described an incident where she faced gender stereotypes at work. While she described this as being a ‘small’ thing, the researcher sensed that this incident had caused a strong emotional reaction (the participant was visibly upset); thus the researcher interpreted the event as being an important one that could potentially influence participation. This event was conceptualised as the ‘Muffins and Men’ event. Pattern analysis confirmed similar events for other participants. Thus, a third strength of identifying events of interaction is that linkages can be made between individual level and group level analysis through cross level inference. This approach, of identifying specific events of interaction, addresses in part the need for a multilevel and relational analysis of influences, as identified in the literature review. A fourth strength of identifying events of interaction is that it is an approach congruent with Critical Realism, where the ‘actual’ domain within Bhaskar’s ‘three domains of reality’ recognises the events people may or may not be aware of.

As Table 49 indicates, several of the events identified in the *Events of Interaction* model are similar to those in previous research. Indeed, a focus on events is not an unusual approach, even from paradigmatic positions other than Critical Realism. For example, from the interpretivist tradition Griffiths, Moore, Burns and Richardson (2007, p. 34) recognised that particular events may “disrupt” the linear “flow” of a woman’s life history. A UK research project, ‘Disappearing women’, identified a range of

‘significant events’ that prompted women to leave the UK IT industry, including being unable to return to the industry following redundancy (Griffiths & Moore, 2010). There is scope to further identify similarities between the events identified in this investigation and previous research.

Table 49 Linking the *Events of Interaction* to previous research

Events of Interaction	Empirical example	Linkages to previous research
Learning recipes	Skill development	Events such as gaining skills using the computer (Trauth et al., 2004)
Ladies’ lunches	Social events to foster networking	Pub/after work drinks culture (Moore et al., 2005a, p. 18)
Are you the entertainment?	Male-orientated practices	Games companies that throw recruiting parties with strippers (Braithwaite, in Cassell and Jenkins, 1998)
Mind your manners	Gendered practices; for example, swearing	“...men that would swear and burp and pass wind and do all sorts of vulgar things...” (Trauth, 2002, p. 111)
Motherhood	Women’s beliefs regarding the incompatibility of career and motherhood	Becoming a mother has been noted as an influence on women’s participation in the ICT industry (Quesenberry, Trauth & Morgan, 2006). In the ICT industry “Taking even relatively short career breaks” is seen as “risky” (Moore et al., 2005a, p. 12)

6.1.5 SUMMARY

This section discussed how Framework 1, the initial guiding analytical framework (that emerged from the review of pertinent literature), has helped foster an understanding of the influences on women’s participation. The key contributions resulting from the analysis of the empirical data using Framework 1 led to the conceptualisation of two models.

The first model, the *Sphere of Influence (SoI)*, helps guide the description of the influences by offering a way to organise empirical data into two categories of environment and person characteristics. Environment characteristics manifest across four dimensions: cultural, social, mediated, and resource-related; and across several properties within these dimensions, including practices, technology, and social agents. Person characteristics manifest as the one dimension of social identity, where properties such as gender and occupation appear central. These characteristics may influence a women’s participation in the DCI.

Extending this description is a second model, the *Events of Interaction (EoI)*. The *EoI* model illuminates 10 events of interaction that may influence women’s participation, such as becoming a parent. A focus on events can tell a richer and more complete story, as it captures the dynamic nature of interaction between the environment and person.

Together, the models begin to offer a unified approach to identifying and understanding influences on women’s participation.

6.1.6 FRAMEWORK 2: THE HUMAN AGENCY MULTI-THEORY SCAFFOLD (HAMTS)

Chapter 2 identified the need for theoretical insight into the phenomenon of women's participation. In response, Chapter 3 introduced the value of using existing theory in the form of a theoretical 'scaffold'; and approach recommended by Walsham (1995b) and by Layder (1998). Chapter 3 proposed the specific research approach of a *Multi-Theory Scaffold (MTS)*, a theoretical tool comprised of four types of theories: meta, critical, middle-range and operationalised. **The MTS was an early contribution emerging from this investigation.**

Framework 2 employed a *MTS* comprised of four existing Human Agency theories (See Section 3.2); this is referred to as the *Human Agency Multi-Theory Scaffold (HAMTS)*. The four agency theories provided 11 initial concepts for data analysis (See Table 41). The researcher's reflection on the value of the *HAMTS* and *MTS* in this section refines the contribution made earlier in Chapter 3. In answering the two research questions—'What are the influences?', and 'How might we understand them?'—there is a need to evaluate the explanatory strengths of agency theory and to evaluate the methodological implications of using a *MTS* in the research process.

The analytical process of employing Framework 2 during data analysis helped to reveal a range of influences, as Section 5.3 presented in the findings chapter. These included; stereotypes, clothing, physical layout of workplaces, social norms (using Giddens meta theory); skills and experience as a source of personal power (using Connells Critical theory); self-efficacy, outcome expectations e.g. rewards, dispositions, self-reflectivity, vicarious experience, feedback, mastery opportunities (using Bandura's middle range theory); and goals, personal values and problem-solving opportunities (using Lent et al's operationalized theory).

Furthermore the analytical process of employing Framework 2 during data analysis culminated in three further findings of a methodological nature. First, a *MTS* provides the research process with certain strengths; for example, it can help sensitise the researcher, offer concepts for analysis, and assist in empirically derived theorisation. Second, employing a *HAMTS* is beneficial to the research process as Human Agency theories offer a useful theoretical perspective with which to understand women's participation; providing concepts such as 'self-efficacy' helps explain the empirical data. These first two findings were foreshadowed to some extent in Chapter 3. However, the third finding—that agency theories are particularly useful in sensitising the researcher to the underlying mechanisms that a Critical Realist ontology seeks to identify—emerged from the data analysis presented in the findings and the theorisation that followed. The first and second benefits are discussed in this section. The third finding regarding

identifying mechanisms is discussed in Section 6.3, as a part of the overall synthesis of the three frameworks.

THE VALUE OF THE *HAMTS*

The *HAMTS*, proposed in Chapter 3, offered concepts from four different types of agency theories with which to analyse the empirical data and understand the influences on women's participation in the DCI. There were several benefits of employing the four agency theories in the *HAMTS* to the data analysis process. The multiple theories fostered multi-level analysis; provided a wide range of concepts for the exploratory research; provided an initial theoretical baseline of complementary perspectives; and stimulated the theorisation process; leading to a deeper understanding of the phenomenon of women's participation.

The *HAMTS* revealed influences across multiple levels, such as societal constraints, power relationships and individual cognitive mechanisms. The four theories identified in Table 11 offer a more complete story than one theory. For example, Giddens' *ST* (a meta-theory) drew attention to social norms and power. Bandura's *SCT* (a middle-range theory) drew attention to influences manifesting at the individual level, such as self-efficacy. As Giddens emphasises, both macro and micro level influences must be recognised to make "connections" between them (Giddens, 1991, p. 112). Recognising macro and micro levels may also be an important precursor to identifying interactions (DiMaggio, 1991).

The *HAMTS* offered 11 concepts for data analysis; a wider range of possible concepts than one theory might have offered. Furthermore, the researcher was sensitised to a multitude of further concepts. Turner (1991) proposed that Giddens' *ST* alone offers 11 sensitising concepts. Concepts that had not been used in the *HAMTS* became relevant as analysis progressed. For example, the empirical data suggested that 'problem solving' was an important element of participants' enjoyment of their DCI roles. The researcher recollected that Lent et al., (1994) proposed problem solving as a possible mechanism, not as a variable in their *SCCT* model, but as one of the 12 propositions put forth in developing the model. Although the concept of problem solving was not one of the initial concepts specified in the *HAMTS*, the early sensitisation to the concept was beneficial as the researcher returned to the concept when it surfaced in the empirical data. Several theories, in contrast to one, offer a wider range of initial concepts and this is important for exploratory research that aims to avoid a closed approach.

The *HAMTS* offered a theoretical baseline from which to understand influences. Drawing on agency theories during analysis assisted the researcher's interpretation of influences, particularly less readily visible influences, such as power. Previous ICT-

related research identified ‘power’ as being an influence on women’s participation (Kvasny, Trauth, & Morgan, 2009). However, the findings show that participants made few direct references to power in the current case study. The researcher interpreted power by drawing on agency theory from the *HAMTS*. For example, a participant described feeling excluded from work functions because they were held at strip clubs. The meetings were seen as constraining the participant’s access to resources, and as fostering the ‘old boy’s network’ which creates barriers to power for women. Giddens’ modality of *Facility*, and Connell’s *STG*, both suggest that exclusionary practices involve power relationships. Similarly, participants identified a lack of mentors as being an influence; this may also be linked to power as mentors can provide “reflected power” (Kanter, 1977) and access to resources, such as information and contacts (Ragins & Cotton, 1991). Thus, existing theory can serve as a “baseline” (Giddens & Turner, 1988, p. 28), providing a point from which emerging conceptual or theoretical explanations can be refuted or extended.

The complementary aspect of the four theories in the *HAMTS* fostered deeper understanding of the phenomenon through triangulation. For example, participants described feeling confident when they learnt the jargon associated with technical roles. Concepts from the *HAMTS* help explain ‘confidence’. Bandura’s (1989b; 1997, 2001) *SCT* explains that mastery skills may lead to a raised sense of self-efficacy. The command of verbal skills is seen as contributing to power (Bryant & Jary, 1991, p. 10). Connell’s (1987) *STG* draws to attention that jargon and skills may contribute specifically to women’s participation by suggesting that “skilling and training is one of the mechanisms by which the sexual division of labour is made a powerful system” (p. 100). Lent et al.’s (1994) *SCCT* provides examples of mechanisms that may be involved in skill development. Thus, the different theories foster a deeper explanation of an influence such as ‘confidence’.

Upon reflection, employing the *HAMTS* has presented the researcher with challenges; however, not to the extreme that Kincheloe (2001) described as the theoretical “bricolage” leading to the “madness” of the researcher (p. 681). The most significant challenge in using more than one theory is that it requires of the researcher a great deal of knowledge with respect to several different theories; particularly in the effort to juxtapose terminology and concepts in a meaningful manner. Certain theories in the *HAMTS* offer particular challenges. Meta theories, for example, can be very abstract; Giddens’ *ST* has been described as “quicksilver” (Craib, 1992, p. 11), a “theoretical omelette” (p. 13), and having a conceptualisation of structures so “vaporous that it is next to impossible to get a grip on them” (Healy, 1998, p. 510). Limitations in understanding the theories can lead to a shallow explanation of influences. However, a *HAMTS* aims to

stimulate original insight by offering a toolbox for explanation; it does not offer the finished product.

REFLECTION ON THE USE OF A *MTS*

The previous discussion considered the value of multiple agency theories during analysis; that is, the value of the *HAMTS*. However, a *MTS* is not limited to agency theory; other theories may be equally useful. As Chapter 3 noted, a *MTS* does not specify which theoretical perspective should be used, but rather offers an approach to choosing four types of theories to scaffold exploratory case study. When using a scaffold, “there is no such thing as best theory only different ways of seeing the world” (Dobson, 1999, p. 261). Each of the four different types of theory: 1) meta, 2) critical 3) middle-range, and 4) operationalised, provides a different level of abstraction, and this can aid data analysis and theorisation. This section provides a reflection on the value of using a *MTS*, in general, in the research process. What is central in this discussion is that there is value in employing more than one theory.

THE THREE BENEFITS OF A MULTI-THEORY SCAFFOLD

As Chapter 3 presented, not only is there “confusion” (Layder, 1998) regarding the use of existing theory to understand empirical data, there is little or no guidance on how to employ multiple theories as a scaffold. The findings indicate that multiple theories may be useful because different types of theories, which offer different levels of abstraction, lead to different insights. Previous research alludes to similar benefits. One of the five types of theory Gregor (2006) proposed is ‘Theory for Explanation’; this contains two subtypes of theories, including theory as a “sensitizing device” (p.624)–of which Giddens’ *ST* is an exemplar. Gregor’s (2006) work not only proposed that different theories offer different types of explanation, but that they may also offer certain benefits to the research process, such as ‘sensitising’. In a similar vain, this investigation proposes that a *MTS* may offer three different benefits to the research process. As Figure 26 illustrates, these benefits are that a *MTS* can: 1) sensitise the researcher, 2) offer concepts for analysis, and 3) foster theorisation. Following is a discussion of each of the three benefits.

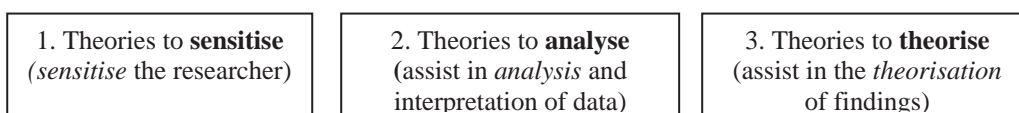


Figure 26: Benefits of a *Multi-Theory Scaffold (MTS)*

1) *SENSITISE*

When we consider theories that *sensitise* the researcher, we are considering “prior theorizing” and “empirical research” as “important inputs” (Miles & Huberman, 1994, p. 33). Theories that sensitise a researcher provide a theoretical orientation, rather than the end point, for inductive research: ‘sensitizing concepts’ rather than a ‘ready to go’ explanatory framework (Patton, 2002). Employing the *MTS* sensitised the researcher to a wide range of concepts that could help explain the phenomenon. Rowlands (2005) suggested that such an initial sensitisation may occur in a preliminary literature review. The findings from this investigation suggest that, although sensitisation occurs early on, it may continue to be of benefit throughout the research process. During data collection, analysis, and in later stages of theorisation, the different types of theories provided a bank of concepts to draw on, as the empirical data suggested their relevance. Drawing on a range of theories (rather than one) to sensitise the researcher was beneficial in the exploratory case study as it initially encouraged a broad view.

2) *ANALYSE*

As Jones (1999) suggested, *analysing* with theory utilises a prior theory as an analytical framework for the retrospective understanding of empirical situations or cases. Theories identified in a literature review can provide provisional codes (Denzin & Lincoln, 2008; Miles & Huberman, 1994). Researchers have used existing theory to assist data collection; for example, where theory informs the structured interview questions used (Walsham, 1995b). Existing theory can offer orientating concepts for data analysis, where orientating concepts provide a “provisional means of ordering data” (Layder, 1998, p. 108). These provisional codes can suggest a further line of inquiry, or can be dispensed of in the “long run” (Layder, 1998, p. 110). These provisional codes are open to revision, particularly when using theory for theory-building case research, where the researcher is required to remain “open to alternative interpretations of data” to foster “the development of new insights” (Anderson & Kragh, 2009, p.3).

In this investigation, analysis began from the provisional codes derived from the three frameworks proposed in Chapter 3. The salience of these provisional codes was refined as a result of the analysis of the empirical data. Application of the *MTS* assisted data analysis in three ways.

1. The *MTS* provided linkages between empirical data and theoretical explanation
2. The *MTS* provided concepts that could stimulate the analytic process
3. The different theories in the *MTS* encouraged multilevel analysis

1. Employing the *MTS* provided the researcher with concepts that could link empirical data to existing theory. As the findings indicate, each of the 11 concepts (from

the Human Agency theories in the *MTS*) could be matched, to some extent, to the empirical data. This matching process offered a form of triangulation between theory and the empirical data. Furthermore, those same theories could offer a step towards explaining influences identified from the empirical data. For example, Bandura's work provides a body of literature with which to understand why role models may influence participation. Thus, the *MTS* assisted in moving the research outcome from exploratory and descriptive towards explanation.

2. Employing the *MTS* provided the researcher with concepts that could stimulate analysis. As previously noted, the *HAMTS* drew attention to the influence of 'power'. Giddens' *ST* emphasises that power is a causal capacity of society. For Connell's *STG*, as is the case with most critical theory, power manifests as a result of social structure and is seen as belonging to the male majority, and being exercised to constrain women's participation. However, participants' accounts offered little direct evidence of the concept of power. The empirical data challenged the theoretical concepts in the *MTS*, and led to the researcher considering different explanations; that power may be expressed as a personal power. Layder (1998) suggested that drawing on theory is useful when the researcher runs 'out of steam'. General theory, particularly Giddens' *ST*, can introduce "new lines of attack", and new sources of creativity and inspiration, to the explanation and interpretation of the data (Layder, 1998, pp. 124-125). Theories can assist by "unfreezing" thinking through the juxtapositioning of the different perspectives or "conflicting realities" (Eisenhardt, 1989, p. 546).

3. Employing the *MTS* assisted in the multilevel and relational analysis of the data. Recognition of macro and micro influences is congruent with a Critical Realist approach, which assumes mechanisms manifest across different strata such as society, the individual, and biological and (even) meta-physical dimensions. Employing different types of theory drew to attention a much wider range of influence, across more levels than one theory could have.

3) *THEORISE*

To *theorise* involves the re-conceptualisation of data (Jones, 1999). This re-conceptualisation requires the researcher "to scan, select and discard theoretical perspectives" while "confronted with empirical data" (Layder, 1998, p. 3). Theorisation involves thinking conceptually and analytically in order to answer 'how' and 'why' questions about a phenomenon, and providing explanation through specifying relations and moving from particular to abstract—"to and fro between different 'levels' of reality and analysis" (Layder, 1998, p. 100). In the conduct of the research in this investigation,

the *MTS* assisted theorisation in several ways, primarily the multiple theories strengthened theoretical triangulation

1. Employing the *MTS* strengthened theoretical development. Employing several theories, to be compared to each other and to empirical data, provides a form of triangulation and this assists theoretical development, with a greater triangulation offering more credible conclusions. In addition, employing multiple theories offers a more developed explanation of the phenomenon. The *MTS* fosters statements regarding the explanatory strength of existing theory, as it requires the researcher to consider the limitations a theory has in regards to explaining a phenomenon. Theorising not only entails a comparison of theory and data, but of theories themselves. As Lakatos (1978) suggested, the process of refining theories must involve their evaluation in relation to other theories (p. 13). Indeed, a Critical Realist approach involves the “immanent critique of existing theories” (Yeung, 1997). Utilising existing theory may lead to the modification of theory (Creswell, 1998), extension of a theory (Galliers, 1992), or reformation of theory (Layder, 1998, p. 129).

The *MTS* provides several theories for comparison and, in doing so, can address their respective limitations. Recognising limitations of the theories in a *MTS* can help foster a deeper theorisation of the phenomenon. As Andersen & Kragh (2009) noted, by using theory, it may become clearer how data and theorising add novel insights. For example, Giddens’ *ST* (1984) recognises that a person’s knowledge and capabilities play a part in interaction, there is a suggestion that *ST*’s substantive focus is on the “social practices” (Rose, 1998), rather than on individual action and experience. If Giddens illuminates the ‘aspects of the production of interaction’, it is proposed that Bandura (1997) provides insights into the cognitive mechanisms, such as ‘self-efficacy’, that are utilised by agents in that production. If Giddens’ *ST* suggests that agency provides a space for agents to ‘act otherwise’, then Bandura’s *SCT* explains the mechanisms that assist them to act.

Much of the work surrounding the development of theory from case study recognises the value of using existing theory to strengthen insights. For Eisenhardt (1989), tying emergent theory to existing literature enhances the “theoretical level of theory building from case study research” (p. 545). In case study research, Yin (1994) recommended not only utilising ‘a’ theory, but also rival theories. Walsham (1995b) recommended the use of multiple theories to complement each other.

6.1.7 SUMMARY

This section discussed how Framework 2, the *Human Agency Multi-Theory Scaffold (HAMTS)* helped to both reveal further influences and to offer theoretical explanation of those influences. The *HAMTS* employed in this investigation was comprised of theories relevant to Human Agency, including Giddens' (1984) *ST* as a meta theory, Connell's (1987) *STG* as a critical theory, Bandura's (1986) *SCT* as a middle range theory, and Lent et al.'s (1994) *SCCT* as an operationalised theory. The discussion illuminated how the agency theories, in contrast to another theoretical perspective, have been of particular value in developing a theoretical insight into the phenomenon of women's participation. However, there remains the possibility that other theories may be of value in helping to understand the research problem. These other theories may include other agency theories, or (even) theories not pertaining to agency.

This section also clarified the lessons learnt regarding the methodological approach of utilising the *Multi-Theory Scaffold (MTS)* in general. The *MTS* was an early contribution of the research, as proposed in Chapter 3. The discussion illuminated how a *MTS* assisted the research process in three ways: 1) in sensitising, 2) in analysing, and 3) in theorising. Although a single theory scaffold could offer a similar benefit to the research process, the discussion emphasised the value of employing the multiple theory approach. In a different research design, or with a different research problem, using more than one theory may not be warranted.

A possible limitation of employing a theoretical scaffold is that the distinction between existing theory and emerging conceptualisation may be difficult to make when there is an intertwining between empirical data with apriori theoretical conceptualisations. In response, this investigation aimed to clearly articulate the use of existing theory. An account of how theory was used offers an open, reflective practice, which strengthens the overall credibility of the findings and conclusions of the investigation. Although the choice of which theories to utilise as a theoretical scaffold is, as Walsham (2006) suggested, "essentially subjective" (p. 324), this section emphasised that the choice of theories requires thought. In articulating the use of the *MTS*, there is a greater clarity between the inductive process and the role of theory; this, in turn, assists in the overall exploration, understanding and, ultimately, theorisation of the phenomenon.

6.1.8 FRAMEWORK 3: ONTOLOGICAL (CRITICAL REALISM)

Section 6.1.2 discussed how Framework 1 fostered a rich description of the influences that manifest between the Environment (E) and Person (P), and their Interaction (I). Section 6.1.6 discussed how Framework 2, a *Human Agency Multi-*

Theory Scaffold (HAMTS) moved findings from a description of influences towards an explanation of those influences. This section discusses how Framework 3, the ontology of Critical Realism, fostered further understanding of the influences on women's participation.

The discussion begins by reiterating what is required of a Critical Realist explanation: essentially, the identification or abstraction of mechanisms. Although the abstraction of mechanisms is a central aim for Critical Realist research, it also presents a challenge to the researcher. The discussion describes how this challenge has been addressed when abstracting the mechanisms presented earlier in the findings. The mechanisms identified in Section 5.4.1 of the findings are not explicitly discussed in this section. Rather, further discussion is reserved for Section 6.3.3, as the mechanisms emerge from the synthesis of the findings arising from the application of the three frameworks to the analysis of empirical data.

CRITICAL REALIST EXPLANATION

This investigation provides an explanation of the phenomenon of women's participation in the DCI. But what is meant by explanation? Explanation may involve "explanans (universal laws, frameworks, conditions, triggering causes)", and "explanandum (description of what is to be explained)" (Danermark et al., 2002, p. 106). A Critical Realist explanan involves explaining "why what happens actually happens" (Danermark et al., 2002, p. 52); for example, when considering events (such as those described in Section 5.2.3), the most fundamental aim is to identify a causal effect. Critical Realism aims to answer the question, "What caused those events to happen?" (Easton, 2009, p.4); this is because, as Sayer (1992) proposed, "causal powers are important in any explanation".

The findings from this investigation do not offer an explanation of the phenomenon based on a classical causality of cause and effect but, rather, offer an interpretation of causality from the Critical Realist ontological perspective.⁹² Such an approach is pertinent to a study interested in interaction because, as Chapter 3 discussed, interaction is dynamic. There is no "prescriptive" way to understand interaction due to its unpredictability (Archer, 1998, p. 377). Unpredictability is in part a result of interactions occurring across dynamic, open, stratified systems (Mingers, 2002, p. 299) in which there are a multitude of mechanisms at play, contingent on other mechanisms, and which may or may not be triggered. Sayer (1992) argued that mechanisms, being generative rather than prescriptive, can sometimes produce "different events, in different

⁹² See Popper or Hume

conditions” (p.116); thus, “causality is dependent on conditions” (p. 106). We can, however, say that certain objects “tend to act or behave in a certain way” (Danermark, 2002, p. 56). Therefore, an explanan involves probability, where “causal laws...must be analysed as tendencies” (Bhaskar, 1978, p. 50), and analysis of patterns provides empirical tendencies. Thus, the abstraction of mechanisms involves identifying what is described by Lopez and Potter (2001) as the “tendencies of interaction” (p. 11). These are not universal regularities, and a concept of fallibility is essential (Bhaskar, 1978).

THE CHALLENGE OF MECHANISMS

The Critical Realist emphasis on understanding causal tendencies requires the researcher to identify mechanisms, to “establish the causal mechanisms that combine to form the circumstances of the phenomenon observed” (Montano & Szmigin, 2004, p. 369). Unexplained phenomena can be explained by “proposing hypothetical mechanisms that, if they existed, would generate or cause” the phenomena (Mingers, 2002, p. 300); however, there are problems in the abstraction of causal or generative mechanisms (Hodgson, 2004). **The conceptualisation or abstraction of mechanisms is one of the greatest challenges the researcher faced in the conduct of this investigation.** There are three reasons why abstracting or identifying mechanisms is challenging: 1) the paucity of empirical exemplars of mechanisms, 2) the existence of mechanisms across different levels, and 3) limitations surrounding the empirical observation of mechanisms.

1) The first challenge is that there are few Critical Realist empirical studies to provide exemplars of mechanisms. Although Critical Realism emphasises that there are enduring entities that have “powers or tendencies to act in certain ways” (Mingers, 2002, p.299)—such as physical, social or conceptual entities— that to some extent, mechanisms remain a “buzzword” (Gorski, 2008, p. 151), and “what is missing badly in the existing realist practice ...is how such concrete research is actually conducted to examine generative mechanisms” (Yeung, 1997, p. 70).

2) The second challenge is the multilevel and dynamic nature of mechanisms. There may be a multitude of generative mechanisms at work, several mechanisms may manifest at one level, and mechanisms may exist at lower and higher levels (Bhaskar, 1978). Mechanisms may also be relational and, therefore, research may even consider interactions between mechanisms (Gorski, 2008, p. 159). Mechanisms must be considered across different levels; this is because to overemphasise one level is to be reductive, by employing a flattening ontological perspective (Wikgren, 2005, p.16). However, Critical Realism “gives us little guidance to assess the importance of one causal link compared with another” (Hodgson, 2004, p. 63).

3) The third challenge is that mechanisms may not be directly observable (Gorski, 2008); that is, visible, perceived, or exercised. Although any “observability may make us more confident about what we think exists”, that “existence itself is not dependent on it” (Sayer, 2000, p. 12). Therefore, causal statements are made independent of any empirical observations (Danermark et al., 2002, p. 55). Although mechanisms are “reproduced continuously” they, or their effects, might only occasionally manifest (Lawson, 1997, p.204). For example, mechanisms such as power may be unexercised or, if exercised (at the level of the actual), may not be perceived in the level of the empirical (Bhaskar, 1978).

Ideally, mechanisms in the ‘real’ domain can be identified if they have manifested in the empirical domain (Tsoukas, 1989). However, because reality is an open system, there are no regular conjunctions; that is, mechanisms cannot always be observed or forced to manifest through experimental research processes, and there remains the “impossibility of experimentation” (Yeung, 1997, p.53). The research approached aimed to address these challenges.

APPROACHES TO IDENTIFYING MECHANISMS

In this investigation, mechanisms were abstracted in four keys ways: 1) by reference to mechanisms within the Critical Realist literature, 2) by looking to the broader literature for examples of possible mechanisms, 3) by drawing on Human Agency theories, and 4) by employing retroductive logic during data analysis. Underpinning this approach is Yeung’s (1997) recommendation that mechanisms be abstracted through “careful theorisation and reflection” (p. 59).

1) There are few empirical exemplars of mechanisms in the literature from researchers aligned to Critical Realism. However, two mechanisms are noted: goals and reflexivity. Archer (2000) suggested that reflexivity is the “agent’s most important generative mechanism” (p. 10). Danermark et al., (2002) proposed that goals are important “human only” mechanisms, particularly when we consider that structures cannot set goals (p. 179). Notably, reflexivity and goals are mechanisms that manifest from the individual rather than the environment.

2) The broader literature also draws attention to a number of mechanisms, although not explicitly from a Critical Realist perspective. Connelly (2001), in reviewing an empirical study by Pawson and Tilley, proposed mechanisms that included: a lack of incentive, inaccessibility and unavailability of jobs, and a lack of transport. Notably, these mechanisms appear to manifest from the environment rather than the person.

3) Human Agency theories (in Framework 2) assisted the researcher in abstracting the underlying mechanisms that Critical Realism (Framework 3) seeks to

understand. Agency theory is concerned with interaction between the environment and person, and interaction implies cause and effect relationships. Agency theory makes reference to mechanisms, although not specifically from a Critical Realist perspective. These mechanisms included cognitive processes such as goal setting (Bandura, 1986), self-efficacy (Lent et al., 1994), and social mechanisms such as power (Giddens, 1984; Connell, 1987). Bandura described self-efficacy as one of the most central or pervasive “mechanisms” of human agency (Bandura, 2002b, p. 270). Buchanan and Bryman (2009) noted the relevance of Giddens’ *ST* for sensitising the researcher to generative mechanisms such as trust, norms, beliefs, ontological security, and reflexivity.

As Figure 27 illustrates, the use of the theories in the *MTS* can support Stage 3 of Danermark et al.’s (2002) *Six Stage Model of Explanatory Research*, which recommends the use of extant theory (from an abductive logic) to assist in the abstraction of mechanisms. **This investigation reveals that the abstraction of mechanisms from empirical data can be assisted by the *HAMTS*.** Thus, a *MTS* is a useful addition to Stage 3 of Danermark et al.’s (2002) model.

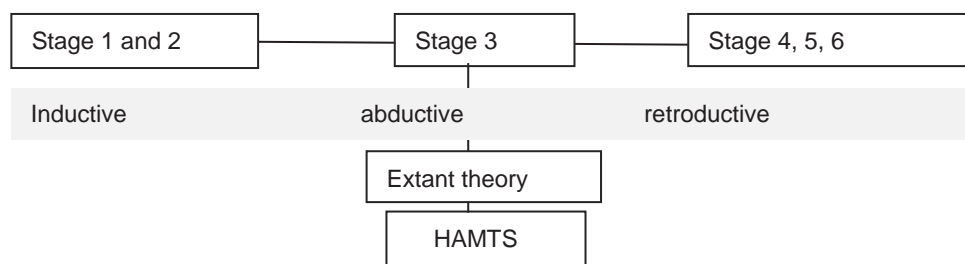


Figure 27: The *MTS* supports Stage 3 of Danermark et al.’s (2002) model

Figure 28 illustrates the concepts from the *HAMTS* that helped stimulate the conceptualisation of mechanisms from the empirical data. For example, participants’ accounts emphasised that developing skills was an important influence on their participation. Bandura’s concept of self-efficacy, and Lent et al.’s concept of self-efficacy, also drew attention to the importance of skill development. The empirical and agency theories helped the researcher abstract the mechanism of ‘doing’. The mechanism of ‘doing’ involves the agent’s actions regarding skill development.

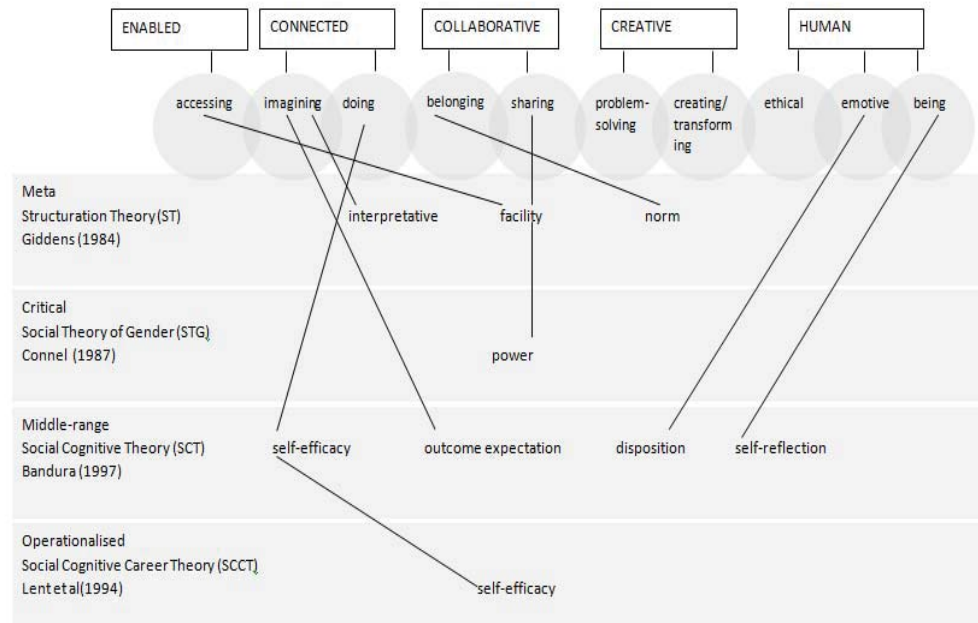


Figure 28: The HAMTS assists in the abstraction of mechanisms identified in the *Five Acts of Agency*

- 5) Mechanisms can also be abstracted from the analysis of empirical data by employing retroductive logic. As noted in Chapter 3, Danermark et al. (2002) suggested that, when utilising retroductive logic to identify mechanisms, the researcher may ask questions such as ‘Could one imagine X without...?’ In light of the phenomenon under study, the researcher posed the question: ‘Can one imagine women’s participation without the mechanism of x?’ This question is a form of theoretical test, with the aim of identifying if an entity has a causal capacity and can, consequently, be considered a mechanism. For example, the question then asked was: ‘Could participation occur without women being ‘enabled’ through access to technology?’ As the empirical data suggested - access is a requirement- and accordingly it was proposed that ‘access’ is a mechanism underpinning women’s participation.

6.1.9 SUMMARY

This section discussed the value of Framework 3 and, in particular, the Critical Realist emphasis on identifying underlying mechanisms. However, this section also highlighted the challenges regarding abstracting mechanisms. In response, the discussion explained how the abstraction of mechanisms was achieved by drawing on existing research—in particular, on Human Agency theories—and by employing retroductive logic tests to the empirical data. In-depth discussion of the mechanisms identified in the findings in Section 5.4 is reserved for the following section, as the mechanisms emerge from the synthesis of the findings of the analysis of empirical data using the three frameworks: the analytical framework (Framework 1), the agency theories in the *MTS* (Framework 2) and the underpinning Critical Realist ontology (Framework 3).

6.2 A SYNTHESIS OF THE THREE FRAMEWORKS

This investigation proposed that the three frameworks outlined in Chapter 3 fostered an understanding of the influences on women's participation in the DCI. The previous sections separately discussed the value of each of the three frameworks. This section illuminates how the synthesis of the findings from the three frameworks leads to the specific focus on agent-driven mechanisms. Section 6.3.1 discusses the complementary nature of the frameworks. Section 6.3.2 discusses how the three frameworks fostered the conceptualisation of the agent-driven mechanisms. Section 6.3.3 details how the 10 agent-driven mechanisms, in the *Five Acts of Agency (FAA)* model, can be used to understand women's participation in the DCI. The discussion draws on empirical evidence and extant theory.

6.2.1 THE COMPLEMENTARY VALUE OF THE THREE FRAMEWORKS

There are certain complementary aspects of the three frameworks that are employed to analyse the empirical data; these, in part, stem from choices made in the research approach adopted for this investigation. For the most part, each of the frameworks provides an approach to revealing and understanding influences by fostering an investigating into the interaction between the environment and person. As Section 6.2.1 explained, Framework 1 specifies the three categories of Person, Environment, and Interaction. Although previous research focused on the first two categories, the review identified the need to focus on the interaction between the two. As Section 6.2.5 explained, Framework 2, which is comprised of concepts from the *HAMTS*, also provides an approach to investigating the interaction between the person and the environment. Human Agency theories theorise interaction, as structuration (Giddens, 1979, 1984), reciprocal relationships (Bandura, 1989b; 1997, 2001), and causal pathways (Lent et al.,

1994). As Section 6.2.6 explained, Framework 3, based on a Critical Realist ontology, acknowledges the interactive nature of society and individual by recognising the experiences of people, the events they experience, and underlying structures and mechanisms. Thus, the complementary quality of the three frameworks strengthens the overall research process and findings.

The complementary aspects of the three frameworks is further supported by their relevance to Danermark et al.'s (2002) six-stage model of explanatory research which, as Chapter 4 (Section 4.3.1) showed, guided data analysis. For example, Stages 1 and 2 of the Danermark et al., (2002) model loosely aligns to Framework 1, as both foster descriptive insights of entities involved in the phenomenon. Stage 3 aligns to Framework 2, as both employ an abductive logic when drawing on existing theory. The use of existing theory is integral within a Critical Realist research process (Layder, 1998). Stage 4 aligns to Framework 3, as both use retroductive logic for the abstraction of mechanisms. Therefore, both Stages 3 and 4 help reveal mechanisms. As Danermark et al. (2002) noted, in practice, the "border between abduction and retroduction is not very distinct as regards to concrete research" (p. 147). Application of Stages 5 and 6 of Danermark et al.'s (2002) model results in theoretical explanation of the phenomenon.

Further synergies between the frameworks emerged during the conduct of the research, and this strengthens the research conclusions. The first synergy was that the frameworks supported each other during data analysis and theorisation. For example, the researcher encountered a difficulty in conceptualising the 'interaction' category from Framework 1. In response, the analytical object of interaction was explored inductively, but with a focus on recognising Bhaskar's events in the 'actual' domain, a concept in Framework 3. A second synergy was that these frameworks foster both descriptive and explanatory outcomes. Although Framework 1 helps describe the circumstances and context that can influence women's participation, a Critical Realist perspective recognises limitations to descriptive insights and aims for explanation of a phenomenon through the abstraction of the mechanisms at play. Recognition of the empirical experiences (the empirical domain) and events (actual domain) is important; however, it is a precursor to the identification of the underlying mechanisms. Bhaskar (1978) suggested that "when a stratum of reality has been adequately described the next step consists in the discovery of the mechanisms responsible for behaviour at that level" (p. 169). These mechanisms were identified by employing Frameworks 2 and 3. Thus, Frameworks 2 and 3 move the findings from description to explanation.

Further synergies between the frameworks emerge when we consider the similarities between the explanations that Human Agency theory (Framework 2) and Critical Realism (Framework 3) offer. Critical Realism is compatible with agency

theories (Montano & Szmigin, 2004, p. 365; Dobson et al., 2007). There is a particular parallel between Bhaskar and Giddens (Mingers, 2004), with Giddens' work considered to be "partly consistent" with Critical Realism (Danermark et al., 2002), and ontologically compatible (Stone, 2001; 2005). Like Giddens' *Structuration Theory (ST)*, the primary objects for Critical Realism are human beings and social structure (Lopez & Potter, 2001, p. 15). Bhaskar (1979) emphasised that interaction is "the 'point of contact' between human agency and social structure" (pp.40-41). Giddens (1984) suggested that interaction can be conceptualised as modalities linking structures and individuals. Furthermore, both recognise the importance of the individual's capability for action. Bhaskar (1991) recognised the individual's capacity to "reproduce or transform" aspects of society (p.76), and Giddens (1984) emphasised the individual's capacity to 'act otherwise'. Additionally, both recognise that individuals may or may not be aware of their circumstances.

Furthermore, both Critical Realism and Giddens' *ST* propose that paradigmatic opposition between structure and agency are pointless. Giddens' theory, in particular, moves towards overcoming ontologically polar stances by bridging the gap "between objectivism and subjectivism", presenting any incommensurability of the paradigms not as a dualism, but as a 'duality' of structure (Giddens, 1984). Such a duality of structure allows for a multi-paradigmatic perspective (Weaver & Gioia, 1994) which, in turn, is commensurate with the differentiated ontology of Critical Realism.

Although there are similarities, the stance taken in this investigation is that the ontology of Critical Realism remains a central tenet in the use of Human Agency theory and interpreting findings. As Archer (1995) proposed, ontological considerations may "actively regulate the associated explanatory programmes" when considering agency theories (p. 22). Therefore, points of contention are resolved by drawing on the Critical Realist perspective in the first instance, in contrast to agency theory. However, such points of contention may be embraced by the research process to make a stronger theoretical argument. For example, when seeking to establish what is meant by the term 'environment', both Critical Realism and Human Agency theory offer insights.

The research took environment (a category in the *SoI* model) to be similar to 'structure', a term often appearing in the Human Agency theory and Critical Realism literature. Structure is a fundamental concept because it highlights the importance of setting in social processes (Reskin, 2003). Although a "basic and essential" concept, 'structure' is also a highly "ambiguous and contested" concept (Thompson, 1984, p. 156). The ontological status and explanatory power of 'structures' differs among the methodological individualists, and methodological holists, realists and elitists (such as Giddens) (Archer, 1995, p.105).

For agency theorists, such as Giddens, structures (rules and resources) exist only in the instantiation created by the agent's actions (acknowledged or not); they are "virtual", existing only in "memory traces" (Giddens, 1984, p. 17). For the Critical Realist, Giddens' conceptualisation of structures presents "ontological problems of two kinds" (Archer, 1995, p. 107). A Critical Realist "stratified view of agency" would consider both "prior structural conditioning and individual personality differences" (Archer, 1995, p. 132). Structures must be seen as "real entities with powers, tendencies and potentials" (Archer, 1995, p. 106); otherwise, they lack analytical significance (Mutch, 2007). For Critical Realists, structures are not only instantiated by the agent, but are also underlying organising principles, which may exist outside of social practices of contemporary agents. Critical Realists do not see structures as 'virtual' but, rather, as "actual forms of social organisations" (Dobson, 2001b, p. 206), such as "educational systems, political parties" (Archer, 1995, p. 107).

Although Human Agency theory and Critical Realism differ in their conceptualisation of structures, both agree that structures do not ultimately constrain or predetermine the participation of the person. Structures can be thought of as a "conditioning effect" that supply the "reasons for different course of action to those who are differentially positioned" (Archer, 1995, p. 154). Although structures have a causal effect, it is possible for individuals to either reproduce or transform the structures, regardless of whether the person involved is aware of the structures. Recognising the characteristics of the environment and the circumstances or structures that women face is important; equally so, however, it is important to recognise how women overcome those constraints, or (even) embrace supports.

The second point of contention is the concept of interaction. Although both Human Agency theory and Critical Realism recognise the interaction between the person and their environment, Critical Realism requires a clearer ontological distinction between the interrelated categories of human action and social structure (Reed, 1997; Archer, 1995). Giddens' conception of interaction as a duality is questioned by Critical Realist theorists. Along with other 'elist' theories, Giddens' *ST* is seen as being ontologically flat (Archer, 1998; Emirbayer & Mische, 1998), conflating structure and agency and macro and micro elements (Mouzelis, 1995). Giddens views structure and agency as mutually constitutive (and hence inseparable) elements (Willmott, 1997), and is criticised for blending the two (Layder, 1998). This conflation leaves little room for analytical examination of the elements of the individual and society (for example, environment) (Layder, 1998; Willmott, 1997), and limits the researcher's ability to "examine their interplay" (Archer, 1988, pp. 77, 80).

If Giddens suggested that there are two sides to a coin (the individual and society), then Archer (1988) asked ‘How can one see both sides of the coin at the same time?’ Archer (1995) suggested that the relationship between a person and society is much more complex than theories that conflate ‘structure’ and ‘agency’ (such as Giddens’ ST) can explain (p. 133). This may explain criticisms that “discussions of agency to date have not dealt with different levels of analysis” (Hitlin & Elder, 2007, p. 173).

Analytical dualism offers a methodological approach for Critical Realist research (Archer; 1995; Dobson et al., 2007)⁹³, being the other “door” to examining agency and structure, alongside ST (Willmott, 1997).⁹⁴ Analytical dualism allows us to see “what is particular about actors and particular about structures”, and also fosters examination of interaction or the “interplay between” and the “interdependent, but emergent, strata of social reality” (Reed, 1997, p. 31). This approach is preferable to making “the causal powers of agents and their actualization impossible to analyse” (Fairclough, 2005).

Thus, Critical Realism can address the limitations levelled at agency theory which, in turn, can strengthen emerging theorisation. In this investigation, the emphasis placed on analytical dualism by Critical Realism led to a clear analytical distinction being made when analysing the environment and person; more so than if solely using agency theory. However, further consideration of how the concepts of environment and interaction can be further conceptualised or theorised is warranted.

6.2.2 THE FOCUS ON AGENT-DRIVEN MECHANISMS

The previous section elucidated the complementary value of the three frameworks. This section discusses the resultant focus on agent-driven mechanisms, a concept resulting from the synthesis of the findings from the application on the three frameworks; that is, a synthesis of the empirical data, previous research, Human Agency theory, and the ontology of Critical Realism. Agent-driven mechanisms recognise the causal effect of the person. As Figure 29 illustrates, the focus on agent-driven mechanisms further extends the three categories of Environment (E), Person (P), and Interaction (I) proposed in Framework 1.

⁹³ ‘Dualism’ refers to the two strata of ‘social structures’ and ‘human agency’, and ‘analytical’ suggest these can only be identified by social analysis (i.e. not the everyday experience) (See Danermark et al., 2002, p. 181).

⁹⁴ Archer’s own theory (1998) emphasises the need for analytical dualism.

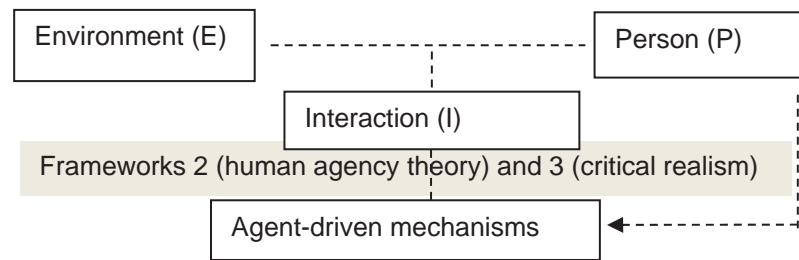


Figure 29: Extending Framework 1 to include the agent-driven mechanisms

The focus on agent-driven mechanisms arose for several reasons, including (simply) that the nature of the empirical data, which consisted of participants' accounts of their experiences, strongly alluded to the causal effect of the person. The women interviewed emphasised how they had overcome the challenges they faced with regard to their participation. However, the participants' emphasis on the role the individual plays in interactions was not captured in the findings resulting from Framework 1, which focused more on the description of environment, person and events of interaction. Framework 2, on the other hand, recognised the persons or agent's capacity to act, because agency theories inherently are concerned with how individuals might have a causal contribution and challenge the contexts they are situated within. For example, Bandura (1997) proposed that individuals can set goals, visualise their capacity, and respond emotionally; this emphasised people's own psychological functioning when considering how they can "exercise influence" over what they do (pp. 2-3). Agency theories propose that interaction involves not only the environment having an effect on the person but, broadly speaking, the individual's "generalised capacity to act" (Calhoun et al., 2002, p. 85). Giddens (1984) proposed that human agents always "have the possibility of doing otherwise" and to "act otherwise" in the face of structural constraints (p. 258). An agent is an entity that can "act or exert power", being a person "capable of producing an effect: an active or efficient cause".⁹⁵

Framework 3, Critical Realism, also helped recognise the role the individual plays in the interaction between the environment and person, as it emphasises the recognition of causal mechanisms. If Human Agency theory recognises a person's capacity to act, then the analysis of the empirical data from a Critical Realist perspective encouraged identifying what mechanisms are involved in 'acting'. If Human Agency theory recognises the potentiality of the actions of agents, then Critical Realism helped to identify the mechanisms the agent employs in actualising that potentiality. Giddens (1979) emphasised rational actions and sought to understand agents' "reasons for their

⁹⁵ <http://www.merriam-webster.com/dictionary/act>

conduct” (p. 7). In contrast, the research findings align more closely to Bhaskar’s stance that individuals may or may not be aware of the mechanisms involved.

The congruency between Human Agency theory and Critical Realism, and the emerging emphasis from the empirical data on a person’s capacity for action, led to the researcher reflectively asking the question: ‘If individuals have a causal effect, what mechanisms are involved in their agency?’ In answering this question, the concept of agent-driven mechanisms was developed, and the research focus narrowed to identifying the agent-driven mechanisms involved in interaction.

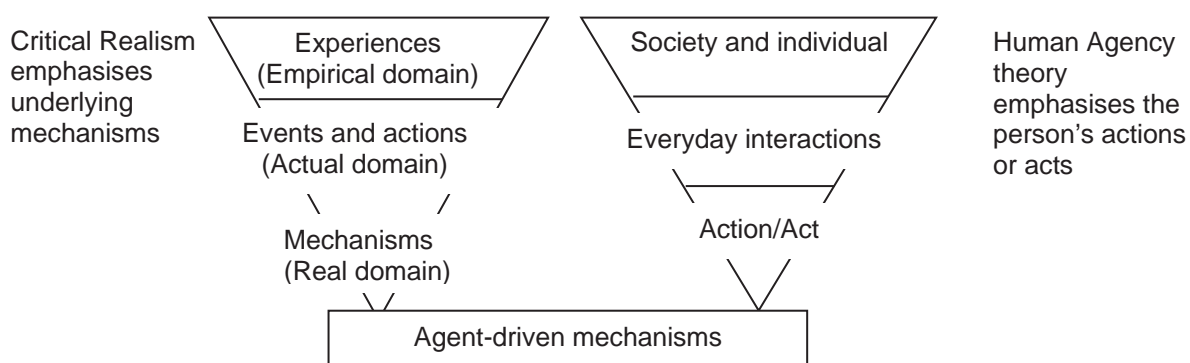


Figure 30: Identifying agent-driven mechanisms by drawing on Critical Realism and agency theory

The identification of agent-driven mechanisms was further refined by asking a second question when analysing the empirical data for evidence of mechanisms. The question asked: ‘Does the *action* of the agent (as per their subjective experience and the researcher’s objective insights) suggest a mechanism is at play?’ As Section 6.3.4 discusses, a focus on an agent’s actions helps to identify mechanisms that may not be readily visible. Although an individual may not be aware of the mechanisms at play, it is less likely that an individual cannot provide an account of their actions. Actions are more likely to be observable by the researcher than mechanisms. Mechanisms, in specific social mechanisms, will involve human activity (Gorski, 2008). Thus, the abstraction of mechanisms involves recognising that the agent is doing something—an action, an act—that has a causal effect. Accordingly, the conceptual labels of the agent-driven mechanisms describe the possible action of the individual. The theoretical test asks whether the agent is ‘doing, imaging, accessing, feeling, and collaborating’, and an adverb or action word labels the mechanism.

Agent-driven mechanisms offer a perspective that contrasts previous research in the ICT context, which has typically focused on barriers and the oppression of women. Where previous research suggests that “circumstances...almost seem designed to wedge” women “from the work they love” (Ramsey & McCorduck, 2005, p.7), agent-driven mechanisms can help illuminate both the enabling and constraining influence of the

individual. Previous research noted that women in the ICT field display “personal optimism”, even when facing structural challenges that led to their feeling “pessimistic” about the industry’s image (Moore et al., 1995a, p. 21). Recognising the causal influence of the individual may help explain why women do participate in the DCI in the face of adverse circumstances.

Agent-driven mechanisms can address, in part, the need recognised in the literature review for research that acknowledges individual differences. The findings do not suggest that every woman’s experience is underpinned by the same mechanisms. Agent-driven mechanisms may manifest in different ways and different combinations, dependant on the environment and the individual themselves. For example, a majority of participants identified the need for role models. Role models can help women visualise or ‘imagine’ their participation. However, this is not to say the mechanism of ‘imagining’ is at play for each individual. Other environment or person characteristics may lead to women ‘imagining’ their participation; for example, women reading a book that describes the industry, or an individual’s self-visualisation. The findings have identified a tendency of certain agent-driven mechanisms within a particular group of women working in the DCI. However, individuals themselves play a role in determining which of the mechanisms they employ.

Agent-driven mechanisms recognise that women can, and do, challenge constraints on their participation. Even though each individual woman interviewed presented a different story of participation, the over-riding similarity of their accounts is that they have overcome the constraints through their own actions. At times, the women have been actively aware of how they fostered their participation (for example, actively seeking information and mentors) and, at other times, serendipitous circumstances have enabled their participation (for example, a chance encounter with someone in the industry).

6.2.3 OUTCOME: THE FIVE ACTS OF AGENCY (FAA) MODEL

Agent-driven mechanisms recognise the causal effect of the person, in contrast to those mechanisms that manifest from the environment or other agents. **The abstraction of 10 agent-driven mechanisms is a key, original, contribution emerging from this investigation.** Table 50 in the findings presented the 10 agent-driven mechanisms, which are: 1) accessing, 2) imagining, 3) doing, 4) belonging, 5) sharing, 6) problem-solving, 7) transforming, 8) emotion, 9) ethical, and 10) being. As illustrated in Figure 31 these 10 mechanisms manifest within five relational, non-hierarchical categories, encapsulated by the proposed *Five Acts of Agency (FAA)* model. The *FAA* provides an original model with which to understand why women participate in the DCI.

Section 5.4.1 in the findings offered empirical evidence supporting the conceptualisation of agent-driven mechanisms. This section further illustrates how and why each agent-driven mechanism influences the participation of female DCI workers. In line with Stages 5 and 6 of Danermark et al.'s (2002) six stage model, the following discussion of each of the mechanisms incorporates reference to theory (for the most part, agency theory) and extant literature (for the most part, the literature related to women's participation in the DCI and ICT industry). As any discussion of findings from a Critical Realist perspective must be done in reference to 'concrete' empirical data, further empirical data is presented.

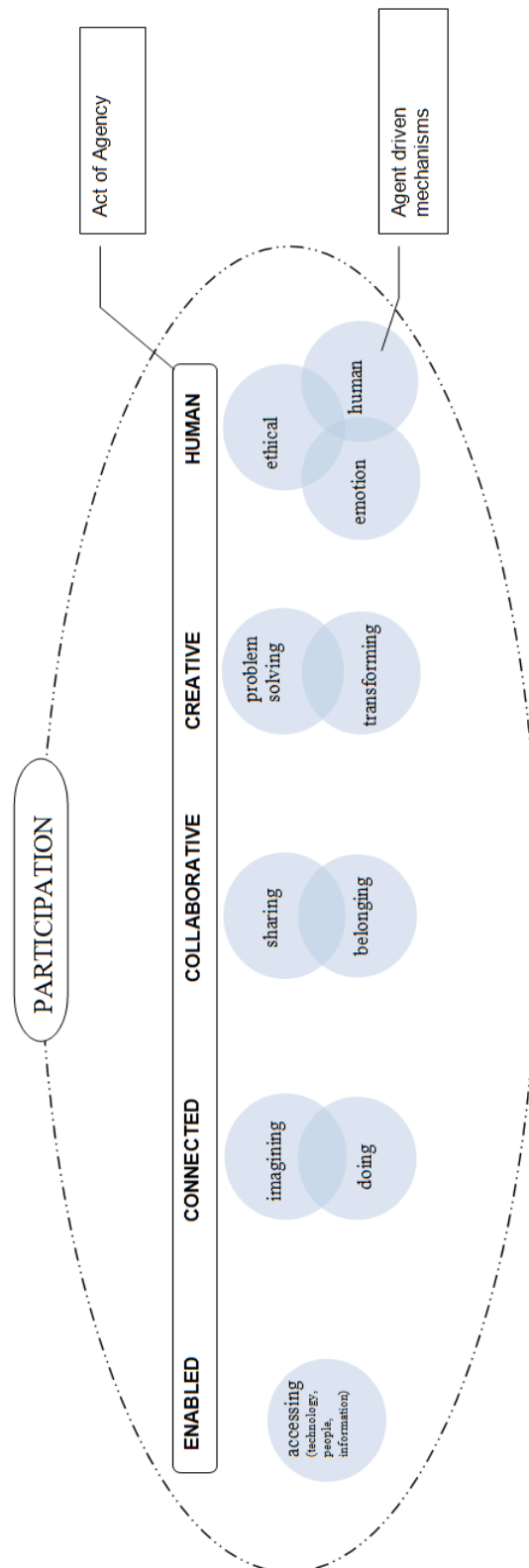
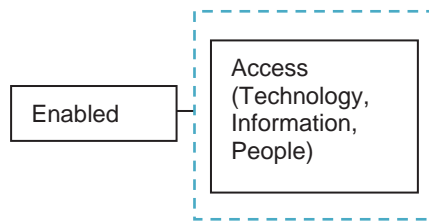


Figure 31: Five Acts of Agency: Ten agent-driven mechanisms

1) ENABLED ACT OF AGENCY



The *Enabled Act* recognises that an individual's participation is fostered when they access resources. There is one key agent-driven mechanism, that of the agent *accessing*. Empirical data indicated that participants accessed resources

such as technology (computers and software), information (job opportunities), and people (mentors). Although there are three distinct types of resources, they are relational as, in everyday life there, are no clear boundaries surrounding them. For example, to have access to people resources might facilitate access to information resources.

ACCESSING: TECHNOLOGY

“When I grew up [...] not everyone had computers” (M7).

The findings identify that, when women had access to resources such as technology, this fostered their skill development. However, access to technology resources differed over participants' life spans. Access to computers in a participant's childhood was often a result of other social agents; for example, a brother bringing home the family's first computer. In the education life stage, participants noted that inadequate access to technology resources within a school setting constrained skill development, and consequently did not equip them with suitable skills for entry into university technology-related programs: *“You know, we had computer class and it was once a week and I think it was only one year or something. Computers weren't really integrated into the school system” (M7).*

In later life stages, participants' access to technology improved, perhaps because of their opportunities as adults working in the industry. Maintaining access to resources whilst on maternity leave was a key strategy employed by women as it fostered ongoing skill development. Participants' access to technology may have also increased as a result of technology becoming more readily available in the wider society over the last decade. As noted previously, understanding influences entails recognising their historical context.

Agency theories offer support for the relevance of the agent-driven mechanism of *accessing*. Findings reveal that access to technology can foster skill development which, in turn, can help strengthen self-efficacy, a mechanism noted by Bandura (1997) and Lent et al. (1994). Further extant literature identifies that access to technology is an influence on women's participation, including research that considers how and why women adopt technology (Venkatesh & Morris, 2000; Ilie, Van Slyke, Green and Lou, 2005). Technological resources are typically noted in the 'digital divide' literature (Castells, 2001; Kvasny & Trauth, 2002; Selwyn, 2002). Women IT professionals cite

access to computers while at school as the most prominent reason for their interest in an IT career (Turner, Bernt & Pecora, 2002). However, Adya and Kaiser (2005) noted that there are mixed messages regarding the influence of access to computers for school-aged girls. It may well be that although technology is important, access has greater nuances (Selywn, 2002), and that technology may be, as Bandura (2002a) suggested, “one component embedded in an intricate network of sociostructural influences” (p.2).

ACCESSING: INFORMATION

“It’s hard to really say definitively girls are being discouraged or whether there’s just not enough information” (G2).

Participants identified the lack of information regarding roles, salaries and opportunities (that fostered entry into the industry) as a constraint on their participation. Access to information occurred through serendipitous or emergent events, such as accidentally coming across a job opportunity on the internet. Alternatively, participants employed active information-seeking behaviours; for example, by researching industry-relevant websites. Previous research noted that industry websites such as gamasutra.com are seen as valuable by DCI workers (Haukka & Brow, 2010).

The extant literature supports the finding that access to information (or the lack of access) is an influence on women’s participation (Tapia & Kvasny, 2004); however, as Archer (1995) suggested: “Knowledge alone is no spur to action (Archer, 1995, p. 131). In post-industrial societies, ‘actionable knowledge’ is also a central resource (Cutler & Company, 1996, p. 1). Hence, there is a link to other mechanisms such as *doing*, which involves using the information.

ACCESSING: PEOPLE

“It’s the people you hang out with and your parents, what they move you towards or the options they open to you” (G6).

The findings indicated that access to people or networking could foster participation. Networking is an action an individual takes to foster their participation. However, male-orientated practices in the workplace could constrain such access. For example, mentors were available to women working in the DCI; however, due to the male majority, these mentors were most likely to male. Male-orientated practices, such as conducting work-related meetings at the pub or strip clubs, were seen as constraining women’s participation because they could exclude them from networking.

Agency theories support the relevance of the agent-driven mechanism of *accessing*. Networking involves accessing people. Agency theories suggest that these people, as “authoritative” resources (Giddens, 1984) or proxy agents (Bandura, 2001), can provide access to other resources. Resources are not capabilities themselves; rather, they facilitate capabilities, where these facilities help individuals “get things done”

(Turner, 1991, p. 524). There was for many of the participants an element of luck, or what Bandura (2006) describes as “serendipity” or “fortuity” (p.166), in accessing ‘people’ resources; for example, in knowing someone (more often than not a male) who had already gained employment in the industry (See findings in Table 44).

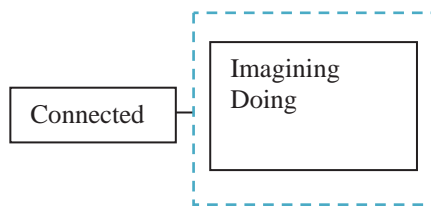
The extant literature identifies that access to other people is an influence on women’s participation. Women working in IT report the “need for extra-curricular socializing with male colleagues as necessary for career progression” (Trauth, 2002, p.101). Women IT programmers noted negatively that too many “discussions took place down the pub” (Moore et al., 2005a, p. 16), and that opportunities for networking occur on “the golf course” (Trauth et al., 2008b, p. 19). Secondary data supports the finding that the male majority can constrain women’s access to people and, consequently, career opportunities.

My personal experience was that work lunches, afternoon golfing, etc. did not include women. That is one place where relationships are solidified, ideas are hatched, promotions are planned, etc. (Appendix 17, Item 31)

Participants identified that one of the greatest challenges in entering the industry was in knowing someone who could facilitate access, particularly as most employment opportunities were ‘word of mouth’ (See Table 44 which summarises the method participants used to gain access into the industry). The findings support previous research, which suggests that access into new media employment is not the traditional job advertisement in the paper, but informal networks (Gill, 2002). In the Australian DCI context, an industry survey identified personal introduction as the most important way to enter the industry (Haukka & Brow, 2010). Even entry as users of digital products, such as games, involves access to social networks (Taylor, 2008, p. 53): “Most people come into game culture through their networks and learn to be gamers within specific social contexts”, usually through a “family member”, friend, or co-worker (Yee, in Cassell & Jenkins, 1998).

Tapia’s (2006) case study of IT dot.com organisations found employees who were hired through personal contacts (for example, friends of the owners) were the most long-lived at each company. The fact that these networks can be a means of enhancing confidence and offering moral support links the mechanism of ‘accessing’ to other mechanisms, such as ‘connecting’, which involves developing confidence or, more specifically, self-efficacy. Thus, the agent-driven mechanism of ‘accessing’ is an important influence on women’s participation. Access can be fostered by the individual, either through embracing serendipitous opportunity, or actively seeking out resources. As Section 6.3.1 further discusses, the agent-driven mechanism of *accessing* can be fostered by strategies that provide access to resources, information, and people.

2) CONNECTED ACT OF AGENCY



The *Connected Act* recognises that an individual's participation is fostered by their identification with the DCI. The act of connecting involves the two agent-driven mechanisms of *imagining* and *doing*. These mechanisms are not so

much social connections to other people, but cognitive connections by the individual to the industry and associated career pathways.

IMAGINING

“There isn't an image of a hot female programmer out there that people want to emulate or aspire to” (G10).

As the findings indicate, an individual visualising or imagining their participation could be an influence. For example, seeing appropriate role models could prompt an individual to imagine themselves ‘in the shoes’ of the role model—a role model being someone that an individual could personally aspire to being (Holland & Lave, 2001). However, findings also reveal that there was a lack of female role models in the DCI. In addition, gaining insight into industry characteristics, such as salaries and lifestyle, could influence participation because it helped the individual ‘imagine’ rewards. However, the findings reveal that inaccurate information could lead to women not connecting with (or being attracted to) the industry, as it made it harder for them to make informed decisions regarding their career. For example, events such as becoming a parent appeared to be an influence because women had no role models who were working mothers and often had little accurate information regarding maternity leave. Consequently, several participants could not visualise or ‘imagine’ themselves as being working parents; this led them to surmise that they would need to leave the DCI when they had children.

Agency theories support the relevance of the agent-driven mechanism of *imagining*. Bandura's (1986) *SCT* drew attention to the importance of role models, and suggested that vicarious observation of role models motivates an individual's expectations, goals, or aspirations. Such motives are the “wants that prompt action” (Giddens, 1976, p. 85) in structuration theory. Lent et al.'s *SCCT* (1994) suggested feed-forward mechanisms (as opposed to feedback) highlighted the importance of anticipation, forethought and active construction of meaning (p. 87). *SCCT* also drew attention to expectations such as materialistic (for example, monetary), social (for example, approval), and self-evaluative (for example, self-satisfaction) outcomes. Furthermore, agency theories other than those in the *MTS* support the finding that people need to visualise what their future may hold. Emirbayer and Mische (1998) suggested that, although the projective element is an important aspect of agency, the individual's

capacity for imagination “has been overlooked in the literature surrounding agency” (p. 971). Thus, agency theory concepts can help explain how women ‘imagine’ their participation.

The extant literature also supports the notion that an individual’s capacity to imagine or visualise can influence their participation. Previous literature identified that negative perceptions of the IT industry, and a lack of female role models, can discourage young girls from pursuing careers in IT (Lang, 2003; Lloyd, 2009; Beekhuyzen & Clayton, 2004). An article reporting comments by the IGDA Women in Games SIG panel laments “that young women could not imagine themselves as game designers” (Appendix 17, Item 11). Thus, the agent-driven mechanism of *imagining* is an important influence on women’s participation.

DOING

“It’s just by exploring and doing things” (M7).

As the findings indicate, gaining skills relevant to the DCI was integral to women’s participation. Not only did gaining skills improve an individual’s ‘confidence’, it could challenge the inaccurate stereotypes regarding women’s capacities. A sense of confidence is central in pursuing one’s goals. Gaining ‘technical’ skills was pertinent to women’s participation, as the DCI involves the use and development of technology. However, further research regarding what ‘technical’ skills entail is required.

Agency theories can help explain why the agent-driven mechanism of *doing* fosters women’s participation. Agency theories explain that the gaining of skills influences, and can foster, women’s confidence to participate. Koesten, Miller, and Hummert (2002) defined self-efficacy as “the belief that one has the capability to mobilize the motivation, cognitive resources, and courses of action necessary to exercise control over one’s environment” (p. 10). Thus, self-efficacy can drive participation. This self-efficacy arises from experiences. As Bandura’s *SCT* explained, a sense of self-efficacy or the self-belief in capability increases through mastery experiences; that is, the individual practice and application of skills (Bandura, 1997).

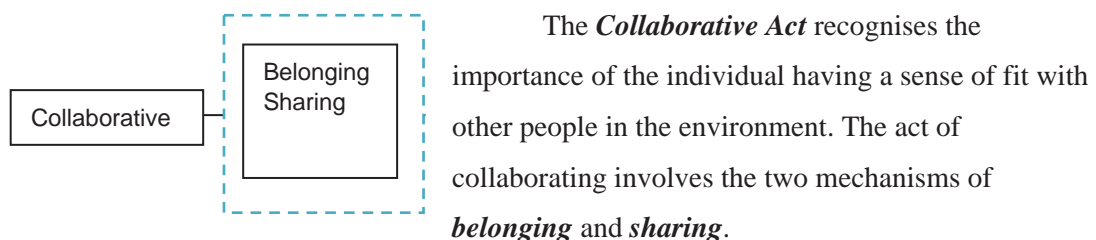
The extant literature also supports the finding that an individual’s sense of capability influences their participation. Previous studies in the ICT domain identified that women may lack confidence regarding their technology-related skills, particularly in late adolescence (Lippa, 2002, p. 29), and late education years (Pearl, Pollack, Riskin, Thomas, Wolf & Wu, 1990). Self-efficacy is an important aspect of women’s capacity when using technology (Betz & Hackett, 1997; Illie et al., 2005). Recent literature regarding the ICT industry continues to recognise self-efficacy as an aspect of students’ participation and worker’s capacity (Kvasny et al., 2011; Joshi et al., 2010). Although an

individual's "natural ability" to work with computers can serve as a "mechanism to an IT career" (Trauth et al., 2008b, p. 28), women also face fewer opportunities to gain technological skills. Hence, many strategies aimed at improving participation rates focus on skill development (Tapia & Kvasny, 2004). Skills relevant to the DCI may be learnt in a variety of ways, where even gaming is considered a "gateway to mastery of a broader range of digital tools" (Hayes, 2008, p. 218). Thus, there may be a link between girls using digital products, such as games, and their participation in DCI career pathways. Hayes (2008) added that when young girls gain mastery experiences in playing games, it can lead to mastery of technical skills and "appropriation of tech-savvy identities" (p. 218). Taylor (2008) suggested that "demystifying play practises" may support self-efficacy as it "increases women's and girls' IT competencies and increases participants' computer confidence" (p. 59). Thus, developing skills relevant to the DCI appears integral to participation.

Even though gaining technology-related skills can foster women's participation, the ongoing demands of 'doing' technology can become a constraining influence. Participants not only identified the need to develop skills, but also the need to continue learning skills in the workplace context, as technology changes quickly. Being given adequate time and resources to maintain those skills supported their participation. Parberry, Kazemzadeh and Roden (2006) pointed out that games workers are expected to learn independently, because the industry continues to push the boundaries of what can be done using new computer technology. This may be because disruptive technologies arrive more regularly in the DCI and are rapidly diffused (DCITA, 2005).

Thus, the agent-driven mechanism of *doing* is an important influence on women's participation. As Section 6.3.1 further discusses, the agent-driven mechanisms in the connected act of agency category can be fostered by strategies that provide role models, mentors and opportunities to develop skills relevant to the industry.

3) COLLABORATIVE ACT OF AGENCY



BELONGING

***“In order for us all do the best we need to work together and not work separate”
(G3).***

***“If you feel like you don’t belong somewhere, you naturally start to question
your reasons for sticking around”.⁹⁶***

As the findings indicate, a sense of belonging or of fitting into the workplace could influence women’s participation. Environmental characteristics that may influence this fit include cultural norms and group dynamics within the workplace. Women often felt they didn’t belong within the workplace due to being in the gendered minority; they weren’t “*one of the boys*” (G2). Findings reveal that everyday cultural practices, such as choice of clothing and open plan office spaces, could foster a sense of belonging. Participants often faced challenges in fitting in because of their gender and the gender stereotypes others held. Events such as “Muffins and Men” highlight that participants are aware of the sanctions in the workplace that women face if they transgress social norms regarding gender stereotypes.

Agency theories help explain why the agent-driven mechanism of *belonging* influences women’s participation. Giddens’ *ST* (1984) drew attention to the agent recognising the social norms that help them fit in or, conversely, the possible repercussions of challenging such norms, including those linked to gender stereotypes. As Giddens suggested, individuals reflexively monitor the risk of being sanctioned, where this sanctioning can occur because of the prescriptions surrounding gender norms.

Further extant literature identified that a sense of belonging is an influence on women’s participation. The DCI presents an organisational culture that emphasises that workers fit into a team-orientated environment and work collaboratively. Communication skills are valued in games production where there is a need to communicate with people (Blake, 2011), and where close relationships exist with publishers (Kerr, 2006, p. 75), fans, and users of products (Deuze et al., 2007). As Roan and Whitehouse’s (2007) study revealed, employees “must be able to fit into the culture. A low ego—there is no room for prima donnas here. A low ego, they must be able to work with others. It’s all teamwork” (p. 30).

Secondary sources of data further support the importance of fitting into a team; if you can “work well with the team, welcome aboard” (Appendix 14, Item 28-M, 33, White, Uni, USA). Thus, as Castells (1997) suggested, being able to align one’s identity with the organisational culture is a valuable asset.

⁹⁶ <http://www.lealea.net/blog/comments/women-in-tech-asking-the-wrong-questions/#ixzz0cP3gNg0> (Appendix 17 Item 31)

Previous research in the ICT domain suggests that it is important that women gain acceptance in the organisation (Trauth, 1999, p. 159). However, an international *Women in Technology* survey identified that 52% of participants stated that they worked in uninviting workplaces where not being heard made them “question whether this is an environment that they wish to stay in”(Appendix 17, Item 47). As Tapia and Kvasny (2004) identified, “If people don’t feel important, they’re not motivated to stay” (p.88). Environmental characteristics that may influence the individual’s sense of belonging include organisational culture. Organisational culture can foster a sense of inclusion, where inclusion is seen to involve ‘a sense of belonging’ when an employee is invited to participate in important decisions, and feels that his or her input matters (Major, Davis, Sanchez-Hucles, Germano & Mann, 2006). A sense of inclusion can lead to better performance, greater job satisfaction, heightened commitment, and the increased likelihood of remaining with the current employer and staying in the IT field (Major et al., 2006).

The findings suggest that women could fit in, or feel as though they belonged, in a number of ways; for example, by making an effort to socialise, to have lunch with colleagues and to share interests, such as the unusual practice of being interested in ‘pirates’. Fitting in could also involve the individual learning the technical jargon involved in DCI occupational roles. As Lave and Wenger (1991) identified, communities of practice involve individuals learning to speak the vocabulary of the community.

A sense of belonging could also emerge from the clothing one wore in the workplace. Due to people’s tendency to categorise each other (Maslow, 1962), outward characteristics such as body and clothing can be an inescapable marker for the social positioning of women. If the organisational culture fostered an environment where non-gendered clothing (such as jeans and t-shirt, in contrast to stockings and skirts) could be worn, this would provide a way for the women to not feel ‘different’ to the male majority.

Thus, the agent-driven mechanism of *belonging* is an important influence on women’s participation.

SHARING

“You learn a lot through that team aspect” (M7).
“I guess that’s what I feel is lacking with my job, like having someone else to talk to about that kind of stuff” (M6).

The findings indicate that sharing practices, experiences, knowledge, and skills with others (such as colleagues) fostered an individual’s participation. In the workplace context, sharing may involve individuals being mentored by others. However, the findings suggest that being a mentor or providing assistance to others in the workplace

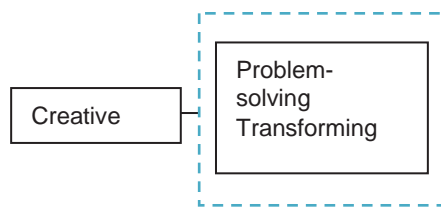
also provides a person with a way to share their experience; this, in turn, can foster their participation. Participants suggested that being valued for their contribution to the team fostered their participation, as it could provide intrinsic reward and supportive feedback. *People ask me questions and I ask them questions about stuff, which shares skills and knowledge [...] I like to work with people and be able to bounce my ideas off people and not worry about them -----ridiculed or anything. I just want to be able to do the best job that I can and that includes being able to rely on the people around me and also being able to know that I can point out something that they could do better umm like the way their solving a problem or something. (G3)*

Agency theories can help explain why the agent-driven mechanism of *sharing* can influence women's participation. Bandura's *SCT* highlights that having access to a mentor provides people with an opportunity for vicarious observation and scaffolding of both skills and practices which, in turn, fosters self-efficacy and goals. Conversely, being a mentor to others can provide intrinsic rewards or positive feedback which may motivate and build the mentor's confidence. Further extant literature also identifies the influence of mentors in the ICT context (Tapia & Kvasny, 2004; Trauth et al., 2009).

The research findings from this dissertation suggest that sharing could be fostered in a variety of ways in the workplace. For example, sharing could involve the sharing of group level achievements. *"You can see all of your work tying together, and you get a real grip of how your work is affecting all the other work" (M10). And: At other companies there is more of a collaborative environment I think we work less hours but work stronger together. And umm a lot of companies I've worked at so far have been like that [and is that important to you] Oh yes definitely I don't like to work in a completely super competitive environment where people are going to be a superstar I'd rather work on something where we can be proud of it together. (G3)*

Participants' preference for open plan style offices can be explained by noting that this type of physical structure encourages transparency, collaboration, and sharing of practices as well as space. Fullerton et al., (2008) suggested that the ideal work environment for women is one with open space. DCI organisations are seen as providing "relaxed and non-hierarchical" working "environments and relationships" (Gill, 2002, p.78). Thus, the agent-driven mechanism of *sharing* is an important influence on women's participation. As Section 6.3.1 further discusses, the agent-driven mechanisms in the collaborative act of agency category can be fostered by strategies that foster non-discriminatory cultural work practices, and those that foster communication between workers.

4) CREATIVE ACT OF AGENCY



The *Creative Act* recognises the importance of the individual having an opportunity for creativity in their occupational role. The act of being creative involves the mechanisms of *problem solving* and *transforming*. Creativity is a highly

valued characteristic in the DCI context, both by employers as it is seen as fostering innovative practice, and by workers who often obtain an intrinsic reward from their creativity. Almost every participant identified that a positive aspect of their DCI careers is that it could provide them the opportunity to be creative.

PROBLEM SOLVING

“You get people that are driven to find out how things work and I want to do that myself you know” (G6).

As the findings indicate, participants found an occupational role appealing if it required problem-solving skills. Problem-solving provided challenges which, when resolved, offered intrinsic and extrinsic reward. Being a problem-solver was seen as an integral trait of a DCI worker. The problem solving appeared to be specifically tied to the workplace, and often surfaced as a result of the rapidly changing nature of technology. However, participants also recognised that responding to these challenges (such as learning new skills and working on cutting edge projects) required a time investment that could distract from a life/work balance. The findings support similar insights in the ICT industry, where Gallivan (2004) identified that IT professionals face a stress associated with the rapid technological changes characteristic of the industry. However, problem solving was not always linked to technology; it could involve participants meeting a client brief in an innovative way or developing a creative design. Different types of problem-solving manifested in different roles.

Agency theories can help explain why the agent-driven mechanism of *problem-solving* can influence women’s participation in the DCI. Bandura’s (1989b; 1997, 2001) *SCT* proposes that intrinsic rewards are a result of a person achieving their goals, and solving problems provides such a reward. *SCCT* proposes that problem solving is a strategy involved in skill mastery (Lent et al., 1994). Smith (2002), who drew on *SCCT* to explain career participation in ICT, suggested that people in IT are “individuals who use the computer as a problem-solving tool of choice” (p. 1). Previous research noted that problem solving can be an influence on an individual’s choice to participate in ICT-related careers. Agosto, Gasson and Atwood (2008) stated that “most studies of why women avoid IT have demonstrated that females who are making career choices care a lot about ‘solving problems’ and much less about ‘technology’” (p. 205). The

importance of women in IT having “challenging workplace projects” has also been recognised (Trauth, 2002, p. 109). Tapia and Kvasny (2004) have recognised that IT employees want to learn, sharpen their skills and hone new ones. The situation is similar in the DCI. A female games industry veteran of 17 years noted that creativity and problem solving are key skills (Blake, 2011)

Studies of IT professionals identified that women rated ‘wanting the opportunity to learn new things’ more highly than they rated ‘salary’. Wanting to ‘gain more expertise’ and not face ‘boredom’ rated more highly than being ‘discriminated against’ or ‘not fitting in’ (Hoonakker, Carayon, Schoepke, 2006). Interestingly, recent research suggested that the capacity for problem-solving may be seen by younger people (college students) as being a gender neutral trait (Joshi et al., 2010). The findings support this previous research; several women expressed the lack of challenge as a constraint on their participation.

Thus, the agent-driven mechanism of *problem-solving* is an important influence on women’s participation.

TRANSFORMING

***“It’s not a creative industry and that was what I wanted” (G7).
“To be good in any job you have to be creative” (M1)***

Although there are challenges in establishing a definition of creativity from the extant literature, it is generally agreed that creativity involves the generation of ideas that are novel and of value (Gruys, Munshi, Dewett, 2011). Creativity involves the individual’s actions (Joas, 1997; Emirbayer & Mische, 1998). Although individuals are “the inventors of new possibilities for thought and action” (Emirbayer & Mische, 1998; Joas, 1993), they often draw on pre-existing resources. “Creativeness rarely springs entirely from individual inventiveness”, but rather “by refining pre-existing innovations, synthesizing them into new ways and adding novel elements to them something new is created”(Bandura, 1999b, p.33). Therefore, it is proposed that the term ‘transforming’ reflects that creativity often involves transforming something.

As the findings indicate, a majority of participants spoke of the appeal of the DCI being a creative industry. Being creative included creating visual designs for web sites, and creating characters and storylines for games. However, there were few empirical examples of how this creativity manifested in everyday workplace situations. It appeared that participants may well enter the industry with the hope of being creative, but find that the certain organisations and work practices constrain opportunities for creativity.

The findings also suggest that opportunities for creativity varied with roles and types of DCI organisations. For example, indie games production organisations were seen as being more creative than larger multi-nationals. This supports previous research,

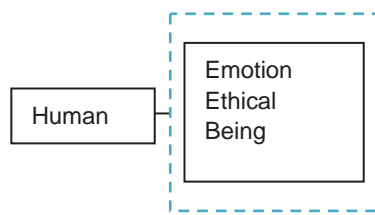
such as Perron's (2003a) which, in reference to women's participation in the new media industry in the UK, noted "that work in the larger firms was more likely to become formulaic and less challenging" (p. 80). Deuze et al. (2007) noted the "tensions" that the environment presents workers with when their creative freedom is tempered by financial control (p. 292).

Agency theories can help explain why the agent-driven mechanism of *transforming* can influence women's participation in the DCI. Although not directly identified by the concepts used from the *MTS*, creativity is an important aspect of agency. Agency theorists, such as Bandura (1986), recognised human creativity and suggested that modelling (observation of a model) could promote creativeness by exemplifying how to create novel syntheses and fresh perspectives that could challenge conventional mind sets. Although most research neglects the human agency involved in creativity, agency itself has a creative element, in the form of creative acts (Sewell, 1992; Joas, 1997), and imaginative and critical intervention (Emirbayer & Mische, 1998).

Extant literature recognises that creativity can influence participation. Creativity is seen as a distinguishing feature of the creative class (Florida, 2002), and as being associated with DCI workers and highly valued in the industry (Gill & Pratt, 2008), particularly within games production (Deuze et al., 2009). Although most research regarding creativity in the DCI has focused on the industry rather than the individual, there is recognition that, for workers in the Australian DCI, receiving feedback on creative work from their immediate peers and industry peers is enormously beneficial (Haukka & Brow, 2010). For women in particular, Fullerton et al. (2008) suggested that an ideal female-friendly job environment encourages creativity, new ideas, interaction and communication. Similarly, one of the reasons given by teenage girls as to why multimedia may be more attractive than IT as a career is that the former is seen as offering the opportunity for greater creativity (Multimedia Victoria, 2007).

Thus, the agent-driven mechanism of *transforming* is an important influence on women's participation; however, further conceptualisation of creativity is required. As Section 6.3.1 further discusses, the agent-driven mechanisms in the creative act of agency category can be fostered by strategies that support creative work practices, and also those that cultivate occupational roles that offer problem-solving opportunities for workers.

5) HUMAN ACT OF AGENCY



The *Human Act* recognises the human capacities that an individual possesses. The human act involves the mechanisms of *emotion*, *ethics*, and *being*. These mechanisms may be difficult to observe or predict.

EMOTION

“being passionate...it's a hard one to quantify. I suppose I could get philosophical...” (S1).

As the findings indicate, an individual's emotions can influence their participation, and several of the events of interaction highlighted these emotions. From a Critical Realist perspective, emotions can be rational, intelligent responses to events (Sayer, 2008).

Agency theories can help explain why the agent-driven mechanism of *emotion* could influence women's participation. Bandura (1997) recognised the salience of emotions in human agency in the form of an individual's disposition. Although Giddens' (1984) modalities did not explicitly identify emotions, his later work (1992) considered emotions such as fear and trust (p.375), and even passion. Giddens (1992) even wondered: “Who can live without passion?” (p. 201). However, Meštrović (1998) argued that Giddens only “touches on emotions fleetingly, here and there” (p.103). Archer (2000), whose work aligns to both agency theory and Critical Realism, identified the salience of a range of emotions, including a sense of trust. Human Agency theories may offer further insight into emotions.

Further extant literature identifies that emotions can foster a woman's participation. Although emotions are not often considered by researchers—being seen as “dirty work” (Lewis & Simpson, 2007, p. 184), and associated with the private sphere (Lewis & Simpson, 2007, p. 4)—the literature concerned with women's participation in ICT has identified that emotions play a role. Creating ‘fun’ experiences, for example, can encourage young women into ICT education pathways (Stockdale & Stoney, 2008), with multimedia being identified by school age girls as being more ‘fun’ than IT (Turner, 2003). In the broader literature, there has been recognition of the need to harness such emotions to benefit the workplace (Mason 2006, p.9). The Affect Theory literature (Gregg & Seigworth, 2010) recognises the role of women's emotions in the workplace.

A central emotion recognised in participants' accounts is passion, particularly the passion they held towards their DCI career. It appeared that an individual's passion was expressed by adopting practices such as staying back late and spending large amounts of time playing games, or completing challenging coding tasks at home. However,

participants found it difficult to define passion. This is pertinent, as it was suggested by two participants (who had hiring responsibilities) that women may not have the same amount of passion (relevant to the industry) that men may. Passion could fuel participation in the face of constraining influences, such as poor salary and long hours. Secondary sources support the idea that emotions, such as passion, play a role in fostering participation; for example, an email from a UK-based group for women in IT asks members if they are “feeling passionate and fulfilled with their career/life” (Appendix 17, Item 26). The email notes that if women do not have their ‘core’ needs met, they will not be able to focus on their passions.

The emotion of passion has been identified in previous research in the DCI context (Gill, 2007; Roan & Whitehouse, 2007; Deuze et al., 2009) and the IT context (Griffiths et al., 2005). Roan & Whitehouse's (2007) study identified passion as being an important employment trait: “The male senior manager maintained that he hired people with a ‘passion for games’ and ‘a passion for programming’” (p.29). Indeed, Consalvo (2008) proposed “one word” as being used to explain why women worked in the games industry–“passion” (p. 185). As the findings highlight, certain industry practices can exploit an individual’s passion; this finding supports Consalvo’s (2008) suggestions that passion leads people into the industry and keeps them going when the conditions are difficult, and that companies trade off such passion to increase output. Passion is problematic in that “the ideal worker is constructed as someone possessing a passion for games, and that passion is used to help maintain work practices that may ultimately kill the passion” (Consalvo, 2008, p.186).

Findings suggest that, although women see themselves as passionate, they may not be perceived as being passionate by others. In the extant literature, Vigdor (2011) recognises that women face challenges in being perceived as being technologically capability and passionate, describing this as a ‘techno-passion’ gap. Vigdor (2011) also brings to our attention the role that previous seminal research, from both Camp and Turkle, has played in perpetuating the notion that women are not passionate about technology. Lang (2007b) suggested that there is qualitative data that supports a disparity between men and women in the ICT industry, with respect to passionate interest. Further research is required into the perceptions surrounding women’s passion for the industry.

The inclusion of emotions as a mechanism does not imply that emotions are the domain of women. Emotions, such as frustration, surfaced not only for females in the DCI context, but also for the male freelancer: *“...just infuriated me because I’d put so much work into the soundtrack and then to have it sort of butchered was really annoying...”* (S1). Similarly, in secondary data sources, a male, white Australian games designer, who responded to the IGDA diversity survey, highlighted that the “school boy

‘conforming’ egotistical and prankster culture” in the Australian games industry led to the development of his depression and social anxiety. He felt ostracised because he did not fit in and “it seemed to make no difference to them how much I showed through my actions that I could design with the best of them and manage a project to success”. He noted that such a culture was “demanding and taxing emotionally” (Appendix 14, Item 28-M (bi), 25, White, disabled, Uni, Australia). However, ICT-related literature notes that emotions such as anxiety may influence women and minorities “more often and more deeply” (Tapia & Kvasny, 2004, p.88). This may be a result of women facing higher performance pressure because of their increased visibility in the workplace in which they are a minority (Tapia & Kvasny, 2004). Thus, the agent-driven mechanism of emotion is an important influence on women’s participation.

ETHICAL

“I don’t call that deviant I call that critical thinking” (S2).

The findings indicate that the mechanism of being *ethical* can influence women’s participation. Although there were few empirical examples, ethics surfaced as a mechanism when it influenced certain decisions by participants. One example involved interpreting a participant’s account of workplace bullying. She described how she questioned the bullying practices of a manager, or the practices in a workplace that encouraged secrecy and fear. That she suggested that bullying ‘wasn’t right’ was interpreted as her questioning the practice.

There was also a specific suggestion that the games industry is perceived as not being ethical. For example, a stakeholder described how games had been “demonised” by the media. The games industry is seen as not offering an attractive career path because of its association with games products that have been highlighted by the media as perpetuating anti-social morals and content that potentially is not appealing to women, with violent content being one of the socially problematic aspects of game play (Shinkle, 2008). For example, the computer game *Grand Theft Auto* has been widely reported in the media as perpetuating both sexism and violence. One participant questioned playing violent computer games (which she would potentially be involved in producing) in front of her toddler.

Agency theories can help explain why the agent-driven mechanism of *ethics* can influence women’s participation. Although not included initially as a concept in the *MTS*, Bandura’s *SCT* (1986) suggests morality, and in particular personal morality, is involved in agency. Similarly, Giddens’ modality of ‘Norms’ explicitly suggests that an individual’s action is closely bound up with the moral evaluations people make, including their awareness of being sanctioned by others. The mechanism of being ethical

could reveal the moral rules that participants are aware of, and that drive their actions. Further extant literature does not readily identify that ethics may be an important mechanism. Elliot (2003) recognised that there is a similar sociological aversion to ethics, with there being an “objectivistically driven fear of emotion and passion” (p. 16). However, the agent-driven mechanism of *ethical* appears to be an influence on women’s participation and requires further research.

BEING

“That’s just me...I’m just aware of these things” (M2).

The agent-driven mechanism of *being* is the most difficult to define, as it has a metaphysical nature; it includes the humanness of the individual, and traits such as an individual’s reflectivity. A succinct definition of the agent-driven mechanism of *being* presents challenges, and further conceptualisation and empirical data is required. In any further theorisation of ‘being’, there may be benefit in drawing on thinkers such as Heidegger. His key work *Being-in-the-world* (Heidegger, 1962) moves the study’s focus from a situated everyday interaction to a more ontic or existential focus of his concept of ‘Being-in’.

The most obvious manner by which the mechanism of *being* surfaced was with participants’ accounts, which showed a high level of reflectivity with regard to their own and other people’s actions and circumstances. Indeed, in asking participants about their experiences in the interviews, there was a sense that they were reflecting or realising something for the first time. For example, when asked about their future plans for children, several responded with a long silence; visually, they appeared to be reflecting.

Participants not only reflected on events and influences, but were also reflexive. Reflection involves the individual considering their own role in an event, whereas reflexivity involves a higher order understanding, enabling the making of connections between the current experience and previous situations (Taylor & White, 2000). Considering this difference between reflection and reflexivity, Archer (2007) suggested that we need to be precise in “what a subject needs to be aware of in order to be influenced” (p. 17). Findings reveal that, when participants recounted their experiences (suggesting reflection), they often described the inaccurate social messages about women and technology (suggesting reflexivity). Thus, these women may be considered what von Hellens, Nielson and Trauth (2001) in the ICT literature refer to as “metalevel observers” (p. 117).

Agency theorists recognise the importance of reflection as a capacity of the agent. Bandura’s *SCT* (1986) highlights the causal effect of an individual’s capacity for self-reflection, and Giddens’ accentuates the “knowledgeability of actors about their social

circumstances” (Archer, 2007, p. 41). An agent is not a ‘cultural dope’ (Giddens, Duneier, Appelbaum, & Carr, 2008) driven to act by social processes beyond his/her control and at the mercy of environmental influences. However, “a great deal of social research just writes out the area of practical consciousness” (Giddens & Pierson, 1998, p. 83).

Further extant literature identifies that *being* (including reflectivity and reflexivity) may be an important mechanism. Archer (2000, 2003, & 2007) posited that reflexivity is the agent’s most important generative mechanisms because, as a subjective power or capacity of the individual, it mediates structural powers. Reflexivity helps us “make our way through the world” (Archer, 2007, p. 32), particularly in a world where globalisation has increasingly freed people from traditional restraints of “common values” to give the individual a “life of one’s own” (Archer, 2007, p. 32). However, as Thrift and May (2001) suggested, women face difficulties in finding a space for such reflection, even when it is an essential part of the self, or of what Giddens (1991) referred to as ‘self-actualisation’.

Thus, the agent-driven mechanism of *being* is an important influence on women’s participation. As Section 6.3.1 further discusses, the agent-driven mechanisms in the human act of agency category can be fostered by strategies that minimise the emotional stress women experience in the workplace, due to their gender or parenting responsibilities.

SUMMARY

This section discussed how the use of the three frameworks (first proposed in Chapter 3) to analyse empirical data, has helped illuminate the influences on women’s participation in the Australian Digital Content Industry. Synthesis of the insights from the frameworks and empirical data led to the conceptualisation of agent-driven mechanisms. The concept of agent-driven mechanisms recognises that influences manifest in the interaction between the environment and the individual, where both have a causal role. However, the emphasis lies in recognising the causal capacity of individuals. The *Five Acts of Agency model* encapsulates 10 agent-driven mechanisms, the conceptualisation of which is supported by the empirical data and extant literature. These agent-driven mechanisms can help explain women’s participation in the DCI.

There are, however, a number of limitations of the findings that must be recognised. One such limitation is that there were only a few empirical examples of certain mechanisms, such as ethics and being. These types of mechanisms are difficult to observe. Future research could strengthen the findings with further empirical data to support the conceptualisation of the mechanisms within the *Five Acts of Agency*.

However, mechanisms cannot always be observed or forced to manifest through experimental research processes, and there remains the “impossibility of experimentation” (Yeung, 1997, p.53). Thus, further refinement of the agent-driven mechanisms will require a continuing balance between empirical data and theoretical explanation.

There are five acts of agency: 1) enabled, 2) connected, 3) collaborative, 4) creative and 5) human. Although treated as separate analytical categories in the *Five Acts of Agency* model, the acts, and consequently the mechanisms within the acts, are interrelated. Stage 6 of Danermark et al.’s (2002) model requires identifying the manner in which mechanisms interact with other mechanisms at different levels, under specific conditions, as a way of explaining concrete events and processes (p. 111). As Sayer (1992) reminded us: “Abstract theory analyses objects in terms of their constitute structures, as parts of wider structures and in terms of their causal powers. Concrete research looks at what happens when these combine” (p. 116). Hence, the discussion has involved highlighting some of the linkages between the empirical data and mechanisms, and among the mechanisms themselves. However, to maintain clarity of discussion, there is minimal reference to how they integrate. Furthermore, the goal for Critical Realism is identification of ‘the’ sole mechanism and the elimination of competing explanations (Yeung, 1997), the identification of the ultimate generative mechanisms (Sayer, 2000), and the level at which mechanisms manifest. As Danermark et al., (2002) reminded us, mechanisms manifest across different strata such as atomic, biological and metaphysical (pp. 61-63).

A limitation of the investigation is the minimal consideration of the linkages, hierarchy and stratified nature of agent-driven mechanisms. Further research could consider the relational aspects of mechanisms and ask if the mechanisms identified by the *FAA model* are irreducible higher level mechanisms, or if there is a hierarchical relationship among the mechanisms.

6.2.4 OUTCOME: THE ACTS OF AGENCY THEORY

This section outlines the logic employed by the researcher to develop an emerging theory entitled the *Acts of Agency*. The discussion reflects Stage 6 of Danermark et al.’s (2002) six stage model, which recommends a synthesis of empirical, theoretical, and ontological insights through the development of empirically-grounded theory. **The goal of this theory is to offer further explanation of the phenomenon of women’s participation in the DCI. The theory may also be generalisable to other contexts of participation and by other cohorts.** As Trauth (2011) suggested, “At heart, a theory is an attempt to understand a phenomenon” (p.5). The theory proposed here is

not comprehensive or complete. Theory can be an “interim product” (Layder, 1998, p. 178), a process rather than a final product (Weick, 1995). The aim is not to suggest theoretical closure, but rather to present a framework to assist developing a clearer explanation of complex realities. The emerging theory is not predictive; rather, it sensitises the researcher to the various elements that may influence women’s participation.

As Figure 30 illustrates, the emerging theory of *Acts of Agency* builds on the models previously presented in this dissertation, including the *Sphere of Influence (SoI)*, *Events of Interaction (EoI)*, and the *Five Acts of Agency (FAA)*. Each model contributes to an overall explanation of the influences on women’s participation. Utilising the *SoI* sensitises the researcher to the Environment (E) and Person (P) characteristics (Elements A and B in Figure 30) that can influence women’s participation. The *SoI* can be thought of as being a theoretical tool that describes what the context and characteristics of the influences are. This can be thought of as theory that explains “What is?” (Gregor, 2006). Utilising the *FAA* model sensitises the researcher to the possible mechanisms at play and moves findings towards explaining participation. This can be thought of as theory that explains “How is?” (Gregor, 2006).

TOWARDS A THEORY OF ACT: ELEMENTS AND RELATIONSHIPS

It is a requirement of theory to specify elements and the relationships among elements. Accordingly, Figure 30 illustrates the elements and relationships involved in the emerging theory of *Acts of Agency*. The element of the Environment (A) requires the researcher to consider ‘what context participation occurs in’. Recognising the element Person (B) identifies the person to whom the agent-driven mechanisms apply. Identifying the *Events of Interaction* (C) helps sensitise the researcher to possible mechanisms at play (D). Recognising a person’s actions (E) helps draw further attention to the agent-driven mechanisms. Recognising action also leads to asking, ‘What are the consequences of the actions?’ (F); that is, ‘What effect do the agent-driven mechanisms have on participation?’ A deep explanation, based on a focus on mechanisms, can be a major contribution to theory (Harrison & Easton, 2004). Element (G) requires the researcher to consider the temporal aspects of participation. Following is a short discussion of each of the elements in the emerging *Acts of Agency* theory.

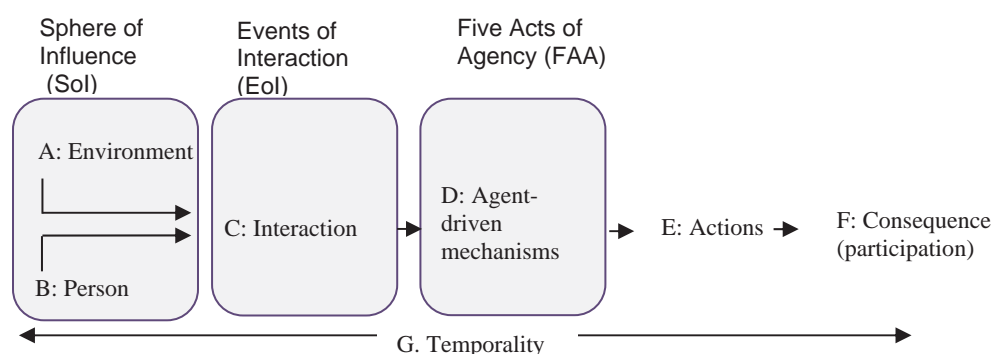


Figure 32: The elements and relationships involved in the *Acts of Agency* theory

A. ENVIRONMENT

As Figure 30 illustrates, the *Acts of Agency* theory requires a consideration of the Environment (E) in which interaction manifests. As Section 3.3.2 discussed, both Giddens and Critical Realists such as Archer (2007) agree that the environment or ‘structures’ impinge upon the agent. The *Sol model* is a useful analytical tool for developing a description of the environment or conditions which, in turn, may give insight into possible influences. However, the environment does not present ultimate causes; there is no one constraining “structure” (Connell, 1987, p. 95). The researcher must consider the uniqueness of the context before asking how the individual interacts with the environment.

B. PERSON

As Figure 30 illustrates, the *Sol model* also encourages a description of the Person (P) element, which acknowledges the characteristics of the individual that may influence their participation. These characteristics include gender; however, the research process has carefully considered the labelling of the categories to avoid labels that may lead to essentialist descriptions of women. There is a need to move beyond simply labelling a person, and towards understanding what Giddens (1993) called the “process of interaction” (p. 128).

The emerging theory of *Acts of Agency* does not label the person category with a gendered label such as ‘women’. The *Sol*, for example, uses the label ‘person’, as it is non-gendered, and the *FAA* utilises the term ‘agent’ when describing agent-driven mechanisms (Element D in Figure 30). The term ‘agent’, like ‘person’, may go beyond the binaries of male and female. However, this investigation is not gender blind; rather, gender is not a differentiating identifier. The *Acts of Agency* theory is only gendered in the sense that the identified conditions are most likely to influence the social identity labelled ‘women’.

There is scope for the agent-driven mechanisms in the *FAA model* to be applicable to other identities. For example, the mechanism of *collaborating* may well foster men's participation, or the mechanisms of *belonging* may be relevant to older workers. Future research could investigate if the mechanisms presented in the *FAA model* are pertinent to the participation of other social identities, including gender (males), ethnicity, and age.

There are several approaches to labelling the person category, each offering a derivation from the core concept of 'human being'. Trauth et al. (2004), in their research on women in IT, emphasised the 'individual'. Archer (1995, 2000), in her argument for a nuanced view of human agency from a Critical Realist perspective, proposed that the individual is a stratified being with emergent properties. She thus distinguished between the person, the agent, and the actor; and in this distinction, the individual human being is seen as emergent from (but not reducible to) their biological make-up. Archer (2000) positioned the agent as "parent" of the actor (p. 11); most importantly, and unlike the actor, the agent can "reflect on their role positions" (p. 284); the actor is seen as an impoverished individual, having "no 'inner passions' of their own, being only influenced by society" (p. 129).

Further development of the *Acts of Agency* theory could refine the person category to acknowledge these stratified aspects of the person.

C. INTERACTION AND D MECHANISMS

As Figure 30 illustrates, the *EoI* model draws attention to specific interaction (I) between the environment (A) and person (B). Identifying events of interaction sensitises the researcher to the mechanisms (D) at play. The *FAA model* proposes 10 agent-driven mechanisms that a woman may harness to influence her participation. These mechanisms have been previously discussed in detail in Section 6.2.3.

E. ACTIONS

Figure 30 illustrates that mechanisms in the *FAA model* may become more readily evident through a person's actions in situated contexts. The role an individual's actions play in their participation has been captured, to some extent, by the labelling of the agent-driven mechanisms, using terms that imply action. For example, agent-driven mechanisms use adverbs such as 'problem solving'.

The *Acts of Agency* theory draws explicit focus to actions, suggesting that it is essential to recognise that the actions of an individual influence their participation. The explanation of how things occur involves recognising that the outcome of an action follows from mechanisms acting in particular contexts. A focus on action is required to "understand how individual action impacts on social situations" (Dobson, 2001b, p. 206).

Where interaction is an analytical category, action can be an observable practice. Mechanisms become evident when individuals, through their actions, display their personal agency. Thus, recognising actions can help reveal the mechanisms at play.

A focus on action is also supported by the Human Agency theory literature. Indeed, Giddens (1984) suggested that action and agency are the “same” (p. 51). Agency must involve a person’s “activity”, and “acting, doing things, making things happen, exerting power, being a subject of events, or controlling things” (Mills, Durepos, & Wiebe, 2009, p. 12). To act through action is implicit in agency theory, as “action is an exercise of human agency, a person’s power to act” (Cochran, 1997, p. 28), or to “act otherwise” (Giddens, 1979, p. 56): “To be able to ‘act otherwise’ means being able to intervene in the world or to refrain from such intervention, with the effect of influencing a specific process or state of affairs” (Giddens, 1984, p.14). Without the capacity to ‘act’ or ‘act otherwise’, there would be no human agency.

Agency is “an active constituting process, accomplished by, and consisting in, the doings of active subjects” (Giddens, 1976, p. 121). This is not to say that meaning behind the actions is discounted. An individual’s account of actions will involve the participant’s meaning, as meaning is about the individual’s “symbolic identification” with the purpose of the action (Castells, 1997, p.7), and meaning is actualised in acts. In this way, agency is an achieved outcome, and a unique response, from the individual.

F. CONSEQUENCE

As Figure 30 illustrates, the emerging theory of *Acts of Agency* requires that the researcher recognise the consequences (Element F in Figure 30) of an individual’s actions (at times exercised as a choice of inaction) within particular conditions. Congruent with a Critical Realist perspective, the theory requires the researcher to look beyond those consequences that the agent recognises. These consequences are tendencies where “different mechanisms can produce the same empirical result” (Sayer, 1984, p. 108). In this investigation, influences (including the environment and person characteristics, the interaction of the environment and person, the agent-driven mechanisms, and the person’s action) led to the consequence of participation.

G. TEMPORALITY

As Figure 30 (element G) implies, there is a temporal aspect to women’s participation. The *SoI* model incorporates temporal aspects by including a lifespan perspective in the social dimension, and the history property in the cultural dimension (as discussed earlier in Section 6.1.2). Where the *SoI* has sensitised the researcher to the temporal aspects that an individual may experience, element G recognises the longer-term temporal aspects.

Both Critical Realism and Human Agency theory recognise that temporality is involved in the interaction between the person and their environment. For Critical Realists, both “historical factors and current context” (Archer, 1998, p.196) are integral when considering the interaction or interplay between the person and structures. Similarly, agency theorists also recognise the role of temporality. For example, temporality was recognised by Giddens with concepts such as the long duree of institutions and individual lifespan (Calhoun et al., 2002). Temporality can illuminate why individuals respond in a certain manner, so as to “account for variability between agents” (Emirbayer & Mische, 1998, p. 963), and to foster recognition of patterns of tendencies.

Although recognition of temporal aspects can add “richness” to theory development (Layder, 1998, p. 177), there are challenges to the inclusion of temporality. One challenge is simply in definition, with one literature review identifying 211 different conceptualizations of time perspective (McGrath & Kelly, 1986). Future research could consider temporality by drawing on theorists such as Emirbayer and Mische (1998), who—in critiquing Giddens for his overemphasis on routine, habitual and taken-for-granted agency—present three temporal elements of past practices, future possibilities, and present contingencies. Likewise, Hitlin and Elders (2007) present four types of temporality within agency—including existential, pragmatic, identity, and life course—and suggest that a clearer articulation of temporality could aid in understanding the use of the concept of agency. From the Critical Realist literature, temporality is considered in Archer’s (1995, 2010) morphogenic model, and in Bhaskar’s (1979) *Transformational Model of Social Action (TMSA)*, where both acknowledge that structures predate actions. Future research may refine the element of temporality in the *Acts of Agency* theory.

GENERALISABILITY OF THE ACTS OF AGENCY THEORY

As noted in Chapter 4, an outcome of good theory is that it is extendable to other situations (Maxwell, 1992). It is proposed that the *Acts of Agency* theory and nested conceptual frameworks (*Sphere of Influence*, *Events of Interaction*, *Five Acts of Agency*) can be used in other research contexts. Although the *Five Acts of Agency* model is context specific (the Australian DCI) and cohort or sample specific (women employed as interactive content creators) the model itself is agnostic in regards to whom and where the question of participation is being asked. It is not a model about gender, it simply recognises that gender is a key sub-category of the person when investigating female DCI workers. For example, in the *Sphere of Influence* model, the category of person could readily be replaced to be another minority cohort such as ethnic (e.g. Asian) and the context of the environment category could readily be replaced to be an education

context (e.g. a school). It is expected the sub-categories would differ, for example occupation (as sub-category of social identity of the person) would not be expected be relevant to a school student. The *Sphere of Influence* model could provide a starting point for an investigation into the participation of other minority groups and within other contexts.

Similarly, the *Five Acts of Agency* can be used as a starting point to investigate the mechanisms at play for other identities and in other contexts. It is expected that many agent-driven mechanisms may be similar, such as ‘accessing’ - the need to access information, people and technology. The actual nature of the information and technology may however differ for the specific cohort. It may be expected that certain agent-driven mechanisms may not be as prevalent in other contexts. For example, the need to be creative through problem solving and transformation may not be as relevant to nurses in a hospital context as it is to those working in the Digital Content Industry. However, it is important to acknowledge that creativity (as a characteristic and action of the individual) is becoming increasingly important across a range of careers. Further research can aim to investigate if the mechanisms identified in the *Five Acts of Agency* model can transfer to other contexts and cohorts.

To date, early versions of the *SoI* and *FAA* models have been used to examine women’s mobile phone usage in Portugal (See Geneve and Ganito, 2010, and Appendix 1 for all publications stemming from this research). This application of the models is not necessarily a statement about generalisability, because generalisation is somewhat incompatible with a Critical Realist stance. It does suggest, however, that the emerging theory (and analytical models) may be transferable for application to other research areas.

SUMMARY

This section presented an emerging theory, entitled the *Acts of Agency*. The theory builds on the models previously discussed, including the *Sphere of Influence*, the *Events of Interaction*, and the *Five Acts of Agency*. The discussion has presented the elements of the theory (including entities such as the environment, person, interaction, and mechanisms), and relationships (including temporality). There are limitations to the initial theory, and these limitations may well be addressed through further empirical work, and also through reference to theorists who can provide insights from a Critical Realist or agency theory perspective. The emerging theory provides a starting point for further theorisation regarding women’s participation in the DCI.

6.3 APPLICATION OF THE FIVE ACTS OF AGENCY (FAA) MODEL

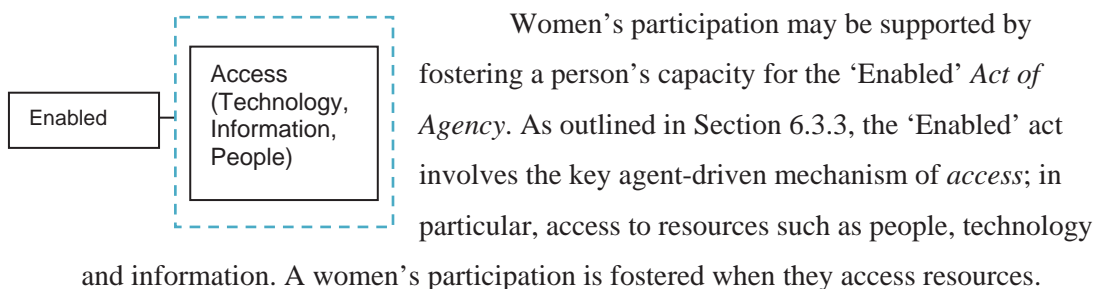
Chapter 2 proposed that a suitable research outcome would include the application of findings—that is, an applied outcome. At the beginning of exploratory research, findings and outcomes are unknown quantities; they emerge as the research progresses. This section discusses how the findings appear to have an applied value.

Chapter 2 introduced the types of strategies undertaken to address the under-representation of women in the technology-related industries (See Table 8). Findings reveal that the *Five Acts of Agency (FAA)* model provides an empirically derived and theoretically informed model of concepts against which to evaluate such strategies and, potentially, to inform new initiatives that can foster women's participation. This section discusses how agent-driven mechanisms in the *FAA* model can both inform recommendations regarding possible strategies (Section 6.4.1), and offer a way to evaluate existing initiatives (Section 6.4.2). The mechanisms in the *FAA* are not definitive solutions; rather, they illustrate possible approaches for initiatives to foster women's participation within ICT and DCI educational and career pathways.

6.3.1 PROPOSING STRATEGIES BY DRAWING ON THE FIVE ACTS OF AGENCY

The following are examples of how agent-driven mechanisms can foster women's participation. Based on these examples, recommendations for strategies that would support women's participation are proposed. A summary of the recommendations is presented in Table 50.

1) ENABLED ACT OF AGENCY



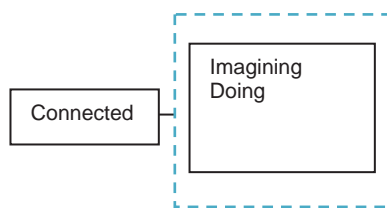
Recommendation 1: Strategies must provide *access* to resources, such as technology (computers), information and people.

Example: Strategies may include use of the internet to provide access to technology, information and people.

Several participants identified that, in early childhood (the 'Family' and 'Education' stage in Figure 10); access to resources such as computers and the internet fostered their skill development. In later life stages (such as 'Education' and 'Work'), these resources also included internet-based material, which offered *access* to accurate industry information, and to tools such as software.

Several participants identified that *access* to mentors during school and in the workplace could foster participation. Existing strategies also recommend providing access to mentors, through the use of internet-based resources as a way to support women in the DCI. For example, in the international games industry, the IGDA offers an online mentorship scheme (IGDA, 2005a). Although participants did not name any particular networking groups, strategies such as *Girl Geek Coffee Club* increasingly provide opportunities for the female ‘geeks’ to network both face to face and online⁹⁷.

2) *CONNECTED ACT OF AGENCY*



Women’s participation may be supported by fostering a person’s capacity for the ‘Connected’ *Act of Agency*. As outlined in Section 6.3.3, the ‘Connected’ act involves the key agent-driven mechanisms of *imagining* and *doing*. A women’s participation is

fostered when they can imagine their participation, or gain the skills to participate.

Recommendation 2: Strategies must assist women to visualise or imagine their participation.

Example: Promote appropriate female industry role models. A suitable role model is one who emphasises occupational capability, while also acknowledging gender and individuality.

The mechanism of *imagining* is fostered when participants see suitable role models. Participants identified the need to see role models they could relate to which, in turn, could motivate them to work in the industry; seeing role models helped them to *imagine* their own participation. However, participants also identified that there were few role models for women in the industry, in particular, few role models of working mothers. Thus, strategies should aim to make role models available and visible to both girls in the education stages, and women working in the workforce.

The appropriateness of these role models must be considered. It is recommended that role models emphasise their capability as professionals, rather than their gender. Strategies that emphasise a sexualised gender must be minimised.

One specific strategy that aims to provide role models for the ICT context is the 2006 *IT Screen Goddesses* calendar⁹⁸. The calendar presents images of women who work in the ICT industry. Biographies in the calendar suggest the women have appropriate skills for the industry. However, the images present the women in provocative poses, based on popular movies; for example, an Oxford graduate, an Associate Professor, and a grandmother pose as the actress Sharon Stone in a sexualised scene from the movie *Basic*

⁹⁷ Geek Girl Coffee Club began as an initiative in Queensland (Australia) in 2009, and has a continuing growing Facebook presence.

⁹⁸ Website of *IT Screen Goddess* calendar <http://www.itgoddess.info/>

Instinct. Proponents may suggest that this initiative reflects a post-modern discursive playfulness in the re-appropriation of imagery, as a tool to challenge the discourse that there are no women working in ICT. Nevertheless, concerns were raised about its appropriateness, as the following quote suggests: “A calendar of scantily clad women definitely does not attract this female to IT. Show me challenging work, a career path, good working conditions, respect and The Money, and I would consider it”⁹⁹ Consequently, the sponsorship from the Australian Computer Society (ACS) was withdrawn upon publication. The ACS president stated: “It is untenable for us to be portrayed as supporting a publication with a naked woman on the cover, in the name of improving the image of women in IT”¹⁰⁰ Findings also reveal that the use of booth babes at games-related conferences was seen as a deterrent for women: “More young girls would aspire to work in video games if they could imagine themselves as more than exhibition props. Video game companies should support that imagination in anyway feasible” (Huntemann, 2007).

Thus, sexualising women working in the DCI or ICT industry is seen as promoting inappropriate role models. In contrast, strategies aiming to provide role models to young girls (primarily aged between 8-14), such as *Tech Girls are Chic: Not Just Geek* (Appendix 17, Item 50), provide industry information alongside insights into more stereotypically feminine pursuits, such as fashion interests. However, in contrast to the *IT Screen Goddess* calendar, content is not sexualized; this is particularly salient considering the younger target audience.

In addition, strategies promoting role models may consider the use of the word ‘geek’. The term ‘geek’ has been widely reported as having negative connotations, particularly for young girls (Beekhuyzen & Clayton, 2004). Strategies such as the *Sexiest Geek Alive*¹⁰¹ pageant, which recognises that IT is “not one of the sexier professions”,¹⁰² aim to redefine the ‘sexiness of geekiness’ for both male and female participants by focusing on “brains, personality and technical creds”, rather than “looks”. The term ‘geek’ can also suggest expertise in technology. Strategies promoting ‘geeky’ women, such as Girl Geek Dinners, Girl Geek Coffee Club (See Appendix 3), and ‘She’s Geeky’ (See Appendix 17, Item 60) intimate that women can be experts with regards to technology. Such strategies contrast existing gender stereotypes, which perpetuate women’s limitations regarding their technical capability.

Recommendation 3: Strategies must foster women’s connection to the industry image.

⁹⁹ Helen July 12, 2006 05:24 PM The Sydney Morning Herald Blogs: MashUp / Cheesecake calendars Archives

¹⁰⁰ Comments reported on third party blog <http://rosemary.id.au/view/blog/hullabaloo/>

¹⁰¹ *Sexiest Geek Alive* pageant http://archive.salon.com/tech/log/2000/03/07/sexiest_geek/index.html

¹⁰² As reported online in popular media <http://news.ninensn.com.au/article.aspx?id=284665>

Example: Articulate an accurate industry image to highlight the various occupational roles involved in the DCI; challenge outdated stereotypes that the industry is all about programming.

The mechanism of *imagining* is fostered when participants can visualise their involvement and develop accurate outcome expectations. Recommendation 1 notes that women need access to industry information. Recommendation 3 emphasises that this information must be accurate, as it helps inform women's perceptions of the industry and, ultimately, their goals.

Findings suggest that the unappealing image of the DCI and related ICT industry can influence women's participation. Secondary data also suggests that stereotypes surrounding ICT result in the perception that workers in the industry are "boring, difficult, and antisocial" (Appendix 17, Item 59). IT lacks appeal as a career as it is seen as boring (Timms, Courtney & Anderson, 2006; State of Victoria, 2007, p.14). The image of certain roles, in particular programming, is perceived as unattractive by young people (Rettenmayer, Berry, & Ellis, 2007). Although the DCI does inherit some of the connotations associated with the ICT industry, it is seen as more appealing, as roles are also associated with creativity (Gill, 2002; 2007). However, this more appealing image is not always communicated by the DCI industry.

Strategies must present accurate and detailed descriptions of occupational roles and skills. If there is any ambiguity in job descriptions, women may believe that they do not have the required skills, or are placed in a position where their outcome expectations are not met. Inaccurate information may in part contribute to the expectation gaps that Tapia and Kvasny (2004) noted for women in the ICT industry. Furthermore, there is a general belief that the DCI requires workers to work long hours. However, findings also reveal that not all roles face such demands. For example, one participant suggested that most artists went "*home by 5.30pm*" (G1). Similarly, several participants suggested that programmers worked longer hours than those in other roles. However, this was not the actual experience of the programmers themselves. Thus, the industry must actively address inaccurate information surrounding occupational roles and work practices.

Recommendation 4: Strategies must offer women support to develop skills relevant to the industry, including 'technical' skills.
Example: Strategies must offer training to women, both early on at school, and later in the workforce.

The mechanism of *doing* involves women developing skills relevant for DCI. When participants developed industry-relevant skills, this helped them improve their self-efficacy and to challenge gender stereotypes of women's technical proficiency. These skills could be developed in a variety of ways; for example, by making personal websites: "*start off with a little personal website...*" (M9). The participants developed

skills through formal training (such as the Diploma of Multimedia for Women), workplace training, or self-directed training. Work experience was also seen as providing an opportunity to develop industry relevant skills: *“Work experience is really good too; if you didn’t want to commit to a full course initially then you can get a little bit of a feel for how a role is”* (M9). However, work experience opportunities appear to be limited in the DCI. A similar situation has been noted by Walters (2006) for IT students. Thus, initiatives aiming to encourage women’s participation must offer training opportunities across education, workplace, and personal contexts.

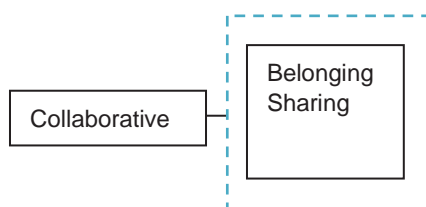
Recommendation 5: Workplace strategies can support a continued connection by the female DCI worker.

Example: Provide opportunities for skill maintenance, particularly for working mothers, through flexibility in work practices.

The agent-driven mechanism of *doing* is fostered when participants not only develop, but also, maintain their skills. Participants identified that they faced challenges in regards to staying in the industry once they were employed. Participants needed to develop skills and maintain those skills in the light of ever-changing technology (for example, new technology), and personal circumstances (for example, when becoming a parent). Those participants that had children described actions that they took to maintain their skills while also addressing their parental responsibilities, such as ensuring they had software at home when on maternity leave.

The ICT literature suggests that the gender gap in the IT workplace can be reduced by introducing flexible schedules, providing refresher training for workers who temporarily leave, and accommodating work/family balance (Lanzalotto, 2007). Flexible working initiatives would allow more women to remain in the sector; however, such initiatives must not result in lower pay and status, or diminished promotional opportunities (DTI, 2005). Australian DCI organisations must provide avenues for women to maintain their skill currency.

3) COLLABORATIVE ACT OF AGENCY



Women’s participation may be supported by fostering a person’s capacity for the ‘Collaborative’ *Act of Agency*. As outlined in Section 6.3.3, the ‘Collaborative’ act involves the key agent-driven mechanisms of *belonging* and *sharing*. A woman’s

participation is fostered when they collaborate and share experiences with other people.

Recommendation 6: Strategies must foster a women’s sense of belonging within the industry.

Example: Provide a work environment that fosters inclusion of minority workers.

The agent-driven mechanism of *belonging* may manifest in environments where people feel supported. Participants described the importance of fitting into the team environments of the DCI workplace. Agosto et al. (2008) suggested that, in an ICT educational context, social cohesion and peer support fosters women's participation. However, both the findings from this investigation and the extant literature identify that being in the minority, due to gender ratios in the workplace, can leave women feeling as though they don't belong. If women are in the minority, organisations should be sensitive to the need to foster a sense of belonging. For example, organisations could provide collaborative workspaces and communal lunch areas.

Recommendation 7: Strategies must foster a culture of sharing in the workplace.
Example: DCI organisations should incorporate collaborative tools within the work environment, and use these technologies to advertise employment opportunities.

The mechanism of *sharing* is fostered when participants can readily share ideas, knowledge, and experiences. Online technologies foster collaboration; indeed, their influence over the last decade may have already supported a change in women's participation: "*I think things already have been changed because people are using Facebook, MySpace, Digg whatever it might be*" (M7). Participants described using online websites to find information that assisted them in their roles; for example, a programmer described finding useful examples of code. Online tools can facilitate the sharing of information, resources, and experiences among DCI workers. These tools could supplement traditional avenues of communication, such as face-to-face communication, that are integral to the process of accessing job opportunities.

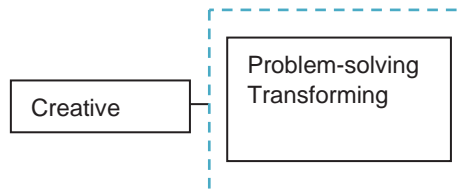
Recommendation 8: Strategies must foster a woman's sense of belonging to the workplace culture.
Example: Organisations must clearly state inclusive organisational cultural practices.

The mechanism of *belonging* may align to previous research that suggests that a sense of cultural fit within the workplace is important for women. Previous research into women in IT has noted the relevance of a sense of fit (Tapia & Kvasny, 2004). Findings reveal that certain unprofessional male-orientated practices in the DCI can ostracise women, rather than foster a sense of belonging to the organisational 'culture'. Examples of these practices include the sexualised booth babes, and meetings conducted in strip clubs.

To foster a sense of 'fit', DCI organisations should have clear and professional work practices, including a description of an organisational culture that fosters equity among workers. This 'culture' may need to cater to younger workers who require family-friendly policies, as well as to an ageing workforce. Even something that seems a small aspect of workplace culture can have an influence. For example, by having a relaxed

dress code, individuals have the flexibility to express their individuality, and women are not forced to conform to gendered norms of wearing dresses and skirts.

4) CREATIVE ACT OF AGENCY



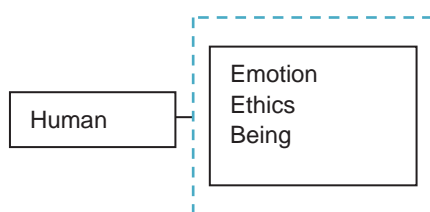
Women's participation can be supported by fostering a person's capacity for the 'Creative' *Act of Agency*. As outlined in Section 6.3.3, the 'Creative' act involves the key agent-driven

mechanisms of *problem solving* and *transforming*. As noted on page 274, creativity is an integral aspect of the industry, and appears to be a key motivator for its workers. A woman's participation is fostered when she can be creative.

Recommendation 9: Strategies must foster opportunities for women's creativity.
Example: Organisations should provide individuals with opportunities for challenging work roles.

The mechanism of *problem solving* can be fostered in the DCI context by providing challenging work to workers. Participants explained that being able to problem solve was a motivating aspect; for example, the challenge of a coding problem or addressing client requirements. Related research recommends fostering problem solving approaches in ICT education, suggesting that it is preferred by female IT students (Agosto et al., 2008). Interventions have recognised that encouraging young girls' creativity could foster their participation (Lang, Craig, Fisher & Forgas, 2010). Thus, DCI organisations must provide workers opportunities for challenging work roles, possibly through research and creative play.

5) HUMAN ACT OF AGENCY



Women's participation can be supported by fostering a person's capacity for the 'Human' *Act of Agency*. As outlined in Section 6.3.3, the 'Human' act involves the key agent-driven mechanisms of *emotions*, *ethics*, and *being*. A

woman's participation is fostered when she feels a sense of completeness.

Recommendation 10: Strategies must recognise the role of emotions.
Example: Organisations can offer environments that foster positive emotions.

The mechanism of *emotion* surfaced in participants' accounts; for example, participants recounted experiencing positive emotions, such as fun, while playing games. Existing strategies aiming to foster young girls' participation, such as *Technology Takes*

you Anywhere, may foster their positive feelings about technology as the initiative aims to provide a fun experience.

Participants also described experiencing constraining emotions in the workplace context. For example, a culture of working long hours may leave working parents feeling guilty for leaving work earlier (due to family responsibilities) than their colleagues. Although both genders have parenting responsibilities, women may face greater gender-related stereotypes as a result of their parenting responsibilities. There were also positive emotions in the workplace, such as pride: *"I noticed that Queensland seems to take pride in the games industry and it also tries to encourage women"* (G7). Thus, strategies that foster positive emotions through the promotion of personal and industry-level success can foster participation.

Recommendation 11: Strategies must recognise the role of ethics.

Example: The DCI can more actively promote the ethical products that it produces.

The mechanism of *ethics* can be fostered if the DCI illuminates the different types of products and practices that exist, such as those emerging from serious games development. Studies indicate that young women see other disciplines, such as education or psychology, as leading to careers that are more focused on solving human problems; consequently, they find these fields more attractive in comparison to IT (Agosto et al., 2008). There is some indication that ethics is surfacing as a consideration for the industry, particularly in game design (Takahashi, 2010). However, there are few strategies to directly promote ethics as an aspect of the industry, and little research (in the DCI context) regarding ethical decisions made in product development (Thompson & Smolt, 2001), or the ethics of games content (Sicart, 2009). One initiative that has drawn attention to the salience of ethics for IT workers is the *ITMillion* web site (See Appendix 17, Item 58), which asks people to share their reasons for pursuing an ICT-related career. Respondents to the website emphasise that doctors and lawyers 'help people', and this suggests these careers are perceived as having societal value.

Strategies could include promoting the various 'ethical' products developed by the DCI; for example, serious games such as *Darfur is Dying* have attracted praise for addressing social issues.¹⁰³ As Fullerton et al., (2008) suggested, a focus on the social value of games could attract women to the industry. This perspective is consistent with Margolis and Fisher's (2002) research, which indicated that female computer science majors are motivated to help the world, rather than simply learn algorithms.

¹⁰³ <http://www.darfurisdying.com/> (Last accessed 30 November 2008)

Table 50 A summary of recommendations to foster the participation of women in the DCI

Recommendation 1: Strategies must provide <i>access</i> to resources, such as technology (computers), information, people.
Recommendation 2: Strategies must assist women to visualise or imagine their participation.
Recommendation 3: Strategies must foster women's connection to the industry image.
Recommendation 4: Strategies must offer women support to develop skills relevant to the industry, including 'technical' skills.
Recommendation 6: Strategies must foster a women's sense of belonging within the industry.
Recommendation 7: Strategies must foster a culture of sharing in the workplace.
Recommendation 8: Strategies must foster a woman's sense of belonging to the workplace culture.
Recommendation 9: Strategies must foster opportunities for women's creativity.
Recommendation 10: Strategies must recognise the role of emotions.
Recommendation 11: Strategies must recognise the role of ethics.

RELATIONAL ACTS AND STRATEGIES

Although Table 52 appears to suggest that the mechanisms in the *FAA* model—and, consequently, the possible strategies—are not relational, there is considerable overlap. For example, being able to *access* technology (Enabled act) may, in turn, help women feel *connected* to the industry (Connected act) through developing skills valued by the industry. A confidence in their skills may foster women's capacity to feel like they *belong* in the work environment (Collaborative act). Skills may also underpin their capacity to be creative (Creative act) and, ultimately, the mechanisms of *emotions* (Human act) such as pride. Thus, the *FAA* model recognises that several mechanisms may be simultaneously at play, and encourages an understanding of influences, and ultimately of strategies, in a relational manner.

Table 51 further illustrates the relational aspect by highlighting how all *Five Acts of Agency* are evident when explaining the influence of 'Motherhood'—one of the 10 *Events of Interaction* identified in the findings. The findings reveal that women need *access* to information to make decisions regarding maternity leave options. Women faced difficulties in staying *connected* with the industry as there were no role models working in the industry; thus, they could not *imagine* their continued participation as working mothers. Women's capacity to be *collaborative* (that is, to feel as though they were 'one of the boys') could also be challenged if they were the only team member to take maternity leave. While on maternity leave, women could remain *connected* by maintaining skills. The difficulties women face in balancing work and life commitments could lead to their facing *emotions* of guilt. Such emotion prompted them to reflect on the value of staying in the industry. An event such as becoming a parent also illuminates the temporal influences. For example, it has only been in very recent history that

Australia implemented a national paid parental leave scheme; this may provide women with resources and options they previously have not had.¹⁰⁴

Table 51 The *Five Acts of Agency* and strategies for the event of motherhood

The Five Act of Agency as evidenced in the empirical data	Possible strategies
Enabled -Limited access to adequate information regarding maternity leave constrained participants' informed decisions	Government and industry to provide career information on maternity leave options as a part of career planning; HR to provide information, for example, suitable childcare options
Connected -A lack of working mother role models	Provide images of working mothers; however, also recognise that working mothers need to retain their professional identity
Stepping away from the work environment may be detrimental to maintaining skills	Provide access to resources that foster skill development when on maternity leave; for example, access to conferences, software and hardware
Collaborative -Working mothers can feel they are the 'odd ones out' in the workplace setting	Foster communication among working mothers across organisations, so that they can share information and advice
Working mothers can feel they 'out the loop'	Provide ongoing contact with those on parental leave (e.g., through email); give the opportunity to 'drop by'
Creative -Working mothers face changes that may influence their ability to remain creative	Creativity or the need to be creative does not disappear with motherhood; recognise that it continues and may transform into other skills, ideas
Human -Motherhood will place demands on a person's emotions	Allow some flexibility in work practices so that women can maintain their passion; do not foster environments that create a sense of guilt (for example, when leaving work early for parental purposes)

6.3.2 EVALUATING STRATEGIES BY DRAWING ON THE FIVE ACTS OF AGENCY

The previous section presented several proposed strategies to foster the mechanisms in the FAA model. Table 52 summarises several empirical examples of the mechanisms in the FAA model that are linked to the recommended strategies to foster women's participation.

¹⁰⁴ An example of contemporary influences includes the fact that Australia was the second last OECD country to implement a national plan for parental leave (in 2011).

Table 52 Examples of agent-driven mechanisms (in the *FAA* model), linked to possible strategies

Act/ Mechanism	Evidence (for example, individual action) of how mechanisms influenced participation	Linkages to environmental characteristics	Recommendations to foster participation	*
1. Enabled (Access)	Seeking industry information on web, and contacting industry mentor, helped individual make informed decisions	Limited accurate industry information	Provide accurate industry information, and networking events, e.g. via an industry website	1
2. Connected (Imagining)	Observing role models helped the individual set goals and future plans; for example, having children	Lack of appropriate female role models	Promote women in industry in non-essentialist manner; for example, not as 'sexualised booth babes'	2, 3
Connected (Doing)	Skills practice and training fostered individual confidence and team 'fit'	Stereotyping lowers women's self-efficacy	Challenge stereotypes; provide access to training and skill development	4, 5
3. Collaborative (Belonging)	Offering assistance to others, fostered individual's sense of 'fit' and feeling supported: "We're like a group of friends"	Male majority leaves women feeling 'different'	Foster socially inclusive workplace practices; for example, shared eating areas	6, 8
Collaborative (Sharing)	Sharing skills fostered intrinsic reward: "People ask me..."	Social stereotypes regarding women; 'soft skills' biases	Provide mentoring schemes (through social media technology)	7
4. Creative (Problem solving)	Seeking challenges fostered intrinsic reward through meeting these challenges	Rapidly changing technology leads to burn out	Implement workplace management strategies; for example, time for training	9
Creative (Transforming)	Fulfilled creative potential; fostered intrinsic reward and recognition	Pressure to develop 'saleable' product constrains experimentation	Implement workplace management strategies to ensure 'play', research	9
5. Human (Emotion)	Passion fuelled effort and motivated the individual	Social stereotypes regarding women's passion	Encourage work practices to manage emotions; for example, stress, guilt over childcare, passion	10
Human (Ethical)	Observing social stigma surrounding certain games prompted the individual to question their involvement	Games content diversified recently (for example, Wii)	Highlight ethical products and practices within the industry	11
Human (Being)	Fostered future planning: "I haven't thought about that"	**	**	

*Link to recommendations identified in Section 6.3.1 **no strategy proposed

In addition, the *FAA* model can help evaluate existing strategies by asking if and how the strategies foster the agent-driven mechanisms. For example, the recommendations put forward by the *Smart Women – Smart State Strategy Science, Engineering and Technology Action Plan 2006 – 2009* (Queensland Government, 2006c) (See Table 53) can be understood with reference to the mechanisms in the *FAA*. Recommendation 1 in the action plan recommends 'promoting the use of accurate terminology'. Promoting accurate information can be seen as fostering a person's capacity to access accurate information, thus aligning to the agent-driven mechanism of 'accessing'. As Table 53 shows, all the recommendations presented by the action plan can be evaluated by asking if and how they foster the agent-driven mechanisms in the *FAA* model.

6.3.3 SUMMARY

This section discussed the application of the *Five Acts of Agency (FAA)* model. The 10 agent-driven mechanisms within the model can be of assistance when planning or evaluating strategies and initiatives that aim to promote women's participation in technology-related careers.

Section 6.4.1 recommended 11 strategies to foster women's participation on the basis that they foster agent-driven mechanisms in the *FAA* model. For example, women's participation may be fostered if a strategy supports a women's capacity for the agent-driven mechanism of *accessing*. The empirical evidence supports the conclusion that access to resources such as technology, information, and people can influence a women's participation in the DCI. Women may not participate if they face obstacles in *accessing* resources; for example, if a 'boys club' culture in the DCI workplace prohibits women's access to information.

Section 6.4.2 proposed that existing strategies can be evaluated against the *FAA* model. Existing strategies—such as those from the *Smart State Strategy* (Queensland Government, 2006c) can be understood by drawing on the concept of agent-driven mechanisms. For example, the strategy recommends role models which, findings suggest, supports a women's capacity for the agent-driven mechanisms of *imagining*.

The *FAA* model provides an original approach to recommending and evaluating strategies that may foster women's participation in the DCI. Further work remains in two key areas. First, in the collection of further empirical data to ascertain if, and how, the agent-driven mechanisms are relevant to strategies. Second, there is a need for further consideration of the agent-driven mechanisms in a holistic manner, as findings to date suggest that a combination of mechanisms may be at play. For example, when a woman becomes a parent, several agent mechanisms may influence her participation. Thus, strategies need to consider not only how they foster an agent-driven mechanism, but also, the value of fostering several mechanisms.

Table 53 Use of the *Five Acts of Agency model* to evaluate *Smart Women – Smart State Strategies* Science, Engineering and Technology Action Plan, 2006 – 2009 (Queensland Government, 2006c)

Smart State Smart Women Strategy		Act of Agency (agent-driven mechanisms)	
1. Promote the use of the terminology 'science, engineering and technology' in Queensland schools <ul style="list-style-type: none"> Investigate the branding of resource materials developed by the Queensland Studies Authority and the Department of Education and the Arts to promote the science, engineering and technology areas, utilising language and ideas attractive to girls 	Outcome: Increased exposure to Science, Engineering and Technology as distinct disciplines for girls in the early and middle years of schooling Measure: Progressive adoption of 'science, engineering and technology' terminology in resources produced by Education Queensland	Enabled (Access-resources such as information) Connected (Imagining)	Providing accurate information assists in making informed career decisions Industry presented in an appealing manner; clarifying types of roles minimises ambiguity and a sense of risk, and can assist goal establishment
2. Utilise existing Queensland Government awards programs to increase the recognition and visibility of women in science, engineering and IT careers <ul style="list-style-type: none"> Include a category for the recognition of female engineers in the Smart Women-Smart State awards 	Outcomes: Recognition of the contribution of women in SET fields Increased role models for women in engineering Measure: Number of awards programs to promote women in SET fields	Connected (Imagining)	Role models help form goals and motivations
3. Undertake a feasibility study for the establishment of a SET Resource Centre for women and girls <ul style="list-style-type: none"> Could provide a gateway to high quality information and resources on SET careers for women and girls in Queensland 	Outcome: Proposal for a "one-stop-shop" on SET resources and careers for women and girls in Queensland submitted to Cabinet Measure: Proposal developed by the Smart Women – Smart State Taskforce	Enabled (Access-resources such as information)	Information can help establish goals by demystifying the industry and presenting career options
4. Work with universities and Engineers Australia to develop a Women in Engineering workshop program which brings together female engineering students from across Queensland <ul style="list-style-type: none"> To be convened by Queensland universities on a rotational basis 	Outcomes: Development of a cohort of female students for research and peer support Decrease in the attrition rate of women from engineering courses who attended the workshop Decreased sense of isolation for female engineering students who attended the workshop Measures: Percentage of workshop participants who report a decreased sense of isolation (three months after the workshop) Attrition rate of workshop participants compared to non-workshop participants	Collaborative (Belonging, Sharing)	A sense of belonging can be fostered by providing access to other women; less likely to be sanctioned in a supportive environment Potential for sharing skills and experiences through collaborative work

5. Identify the range of current SET programs within Queensland that target girls in schools and promote effective models to Government and Industry May include: • Careers Expos • SET in residence programs and • Secondments of industry professionals into schools and vice versa	Outcome: Increase in the number and range of promotional activities for girls in SET Measure: Number and range of programs identified and new ones initiated	Enabled (Access to information), Connected (Imagining, doing)	Enable through information Connect by providing role models Connect by fostering skills development
6. Work with industry to identify best ways to promote family friendly employment practices in SET industries • Promote work/life balance tools • Highlight the Equal Opportunity for Women Agency's (EOWA) annual awards where award winners are from SET backgrounds • Work with Engineers Australia to expand their industry awards program to promote greater recognition of family friendly employment practices	Outcome: Individuals and organisations involved in SET have access to information on how to implement family friendly employment practices Measure: Number of occasions where work/life balance tools and/or information are promoted	Connected (Imagining)	Foster connection by assisting women to imagine future work goals Minimise the conflict between work and family commitments by providing examples of family friendly practices Motivate participants through rewards such as awards program
7. Promote opportunities for women in SET industries to take up leadership roles • By targeting women in SET careers and promoting upcoming Board opportunities • By encouraging professional development and coaching opportunities for women in SET careers preparing for senior management positions	Outcome: Increased number of women from SET backgrounds on Queensland Boards Measure: Number and range of development and leadership opportunities available to women from SET backgrounds	Enabled (access to resources such as people), Connected (Imagining)	Foster a sense of connection by providing female leaders who are role models or mentors
8. Provide information to assist women re-entering the SET workforce after a career break • Explore and promote networking and mentoring opportunities • Link women to information, both before and after career breaks, to assist them with career planning	Outcome: Skilled women seeking to return to a career in science, engineering or technology have access to information about getting support, developing their skills and making contacts Measure: Number and type of networking opportunities and information provided	Enabled (Access-Information and People)	Enable by providing women access to information and people
9, 10, 11. Final three strategies are project-orientated rather than participation-orientated			

6.4 CHAPTER SUMMARY

This chapter discussed the empirical, theoretical, methodological and explanatory contributions the research provides in regards to understanding the research problem:

‘Why do women participate in the Australian Digital Content Industry (DCI)’.

The research addressed Research Question 1, which asked: ‘What are the influences on women’s participation?’ Application of the three frameworks proposed in Chapter 3 revealed a diverse range of influences, which include the characteristics of the environment and person, events, and underlying mechanisms. Each of the three individual frameworks helps to identify influences.

The descriptive insights emerging from the application of Framework 1 (analytical framework) illuminates the characteristics of the environment, the person, and their interactions that may influence women’s participation (See Section 6.1.2). The refinement of the categories in Framework 1 through analysis of empirical data, led to the development of two models: the *Sphere of Influence (SoI)* and *Events of Interaction (EoI)* (See Section 6.2.2 and 6.2.3 respectively). Together, these two models foster a unified description of the environment and person characteristics, and the events that may influence women’s participation in the DCI.

Employing Framework 2 (theoretical framework) extended the description by drawing on concepts from the Human Agency theories (proposed in Chapter 3). Section 6.1.6 discussed the value in employing multi theories to scaffold the sensitisation, analysis and theorisation process. Where a *Multi Theory Scaffold*, in general, offers research many benefits; a *Human Agency Multi-Theory Scaffold* offers a useful specific theoretical perspective for understanding the empirical data and research phenomenon under study.

Framework 3, which was based on a Critical Realist ontology (in general) and Bhaskar’s ‘three domains of reality’ (in particular), fostered the identification of underlying mechanisms. This recognition of mechanisms, as a part of a stratified reality, is central to Critical Realism. Thus, all three frameworks reveal different types of influences.

Furthermore, the research has addressed Research Question 2, which asked: ‘How may we understand these influences?’ In response, the chapter has discussed how each of the frameworks helped foster an understanding of the influences. Framework 1, the analytical framework based on existing research, helped to organise empirical data and link the empirical data to previous research. Framework 2 began to offer further explanation of influences. Where Framework 1 drew attention to influences such as a lack of female role models, Framework 2 and, specifically, Bandura’s *SCT* concept of self-efficacy (See Bandura, 1986; Lent et al., 1994) explains that same-sex role models

can foster self-efficacy. Human agency theory also emphasised the causal capacity of the person. Framework 3 moved findings further towards explanatory outcomes by fostering a causal explanation, with the emphasis on the recognition of underlying mechanisms and causal tendencies. Thus each of the frameworks provides a way to understand the influences on women's participation.

However, as Section 6.3 discussed, it is the synthesis of the findings emerging from the application of each one of the three frameworks that results in the key contribution of the research. This synthesis resulted in the conceptualisation of 10 agent-driven mechanisms within a model entitled the *Five Acts of Agency (FAA)* (as discussed in Section 6.2.3). The 10 agent-driven mechanisms are: 1) accessing, 2) imagining, 3) doing, 4) belonging, 5) sharing, 6) problem-solving, 7) transforming, 8) emotion, 9) ethical, and 10) being. It is proposed that agent-driven mechanisms provide a way of understanding why women participate in the Australian DCI. This chapter illuminated these mechanisms by linking the conceptualisations to further empirical evidence and extant theory.

Section 6.2.4 extended the synthesis by presenting an emerging theory, entitled *Acts of Agency*; this theory integrates the three models arising from the research: 1) *Sphere of Influence (SoI)*, 2) the *Events of Interaction (EoI)* and the 3) *Five Acts of Agency (FAA)*. The theory provides a fruitful position for further theoretical elaboration in future research.

A further contribution of the research was offered in Section 6.4, which illuminated how the agent-driven mechanisms within the *Five Acts of Agency* model can be utilised when planning or evaluating strategies and initiatives which aim to foster women's participation. Eleven recommendations to foster women's participation were made in reference to the agent-driven mechanisms, and are supported by empirical data and existing research.

In summary, this chapter discussed the findings emerging from the analysis of empirical data using three frameworks: 1) analytical, 2) theoretical, and 3) ontological. The synthesis of findings results in several original contributions, including models and an emerging theory. The following chapter provides a conclusion to the research. As Morgan and Smircich (1980, p.12) avow: 'Such conclusions depend very much on the frameworks through which data is interpreted.'

The research presented in the previous chapters provides a contribution towards understanding the research problem: ‘Why do women participate in the Australian Digital Content Industry (DCI)’. The need to address this research problem arises because women are under-represented in the DCI. The research addressed two key research questions, which were: 1) What are the influences on women’s participation in the DCI, and; 2) How might we understand these influences. These questions were addressed by employing three frameworks to analyse a volume of empirical data collected as a part of an exploratory case study; the primary data included interviews from women working in the Australian DCI.

Chapter 2 discussed the previous literature concerned with women’s participation in both the Australian and international DCI and the related Information Communications and Technology (ICT) industry. The literature review identified a wide range of possible influences on women’s participation. As Chapter 3 explained, these influences could be categorised into two broad categories: 1) Environment, and 2) Person and the interaction between these two categories required more consideration than was evident in the existing body of multi-disciplinary literature.

The literature review also highlighted methodological issues, such as the need for both empirical data and theoretical insights from a strongly pluralistic approach to understand the complexity of the influences on women’s participation. Accordingly, Chapter 3 then presented three frameworks (as listed below) with which to analyse the empirical data. The conceptual commonality between the frameworks is their focus on interactions between the environment and person. However, each framework also allowed for the identification of different influences and different interpretations of the influences on women’s participation.

1. Analytical framework—based on existing research and comprised of three categories, 1) Environment, 2) Person, and 3) Interaction (proposed in Section 3.1, and discussed in 6.2.1)
2. Theoretical framework –based on a *Multi-Theory Scaffold (MTS)* and comprised of four Human Agency theories (*HAMTS*) which provide 11 concepts for analysis (proposed in Section 3.2, and discussed in 6.2.5) and
3. Ontological framework –based on Critical Realism and provides three categories; specifically, Bhaskar’s three domains of reality: ‘empirical, actual,

and real' (proposed in Section 3.3, and discussed in 6.2.6)

Chapter 4 described the research design, including the exploratory case study approach adopted as the most appropriate strategy of enquiry to investigate the research questions. The case study methodology offered a way of combining empirical, theoretical and ontological insights to deliver descriptive and explanatory outcomes.

Chapter 5 presented the findings that arose from sequentially employing each one of the three frameworks to analyse the empirical data. The application of these frameworks successfully revealed both influences previously identified in related literature, and new influences pertinent to the DCI context.

Chapter 6 discussed the key influences that arose from examining the data through the frameworks, both individually and collectively, and synthesised the influences into a series of models: 1) *Sphere of Influence (SoI)*, 2) *Events of Interaction (EoI)*, and 3) the *Five Acts of Agency (FAA)*. Each model reveals a range of different types of influences. Influences can include the environment and person characteristics (as encapsulated in the *SoI*); they can include specific events (as encapsulated in the *EoI*), the agent's cognitive processes (as highlighted by Human Agency theory), and underpinning mechanisms (as encapsulated by the *Five Acts of Agency*). The identification of the influences women face helps foster an explanation of why women do, or do not participate in the DCI.

Chapter 6 also considered the research value in applying the frameworks and suite of theoretical models (as will be further explicated in Section 7.1.2). Although each framework reveals different influences, their real value was shown to be in their integrated use to foster the development of the conceptualisation of agent-driven mechanisms. Therefore, the key discovery presented in Chapter 6 was that the most fruitful research outcome was the combination of the insights from the application of the three frameworks, which led to the conceptualisation of agent-driven mechanisms (as was discussed in Section 6.2.3). This conceptualisation was explicated as the *Five Acts of Agency* model (comprised of 10 agent-driven mechanisms), a model to help understand women's participation in the DCI. Agent-driven mechanisms provide an original, empirically grounded, and theoretically driven explanation of why women participate in the DCI.

Further theoretical development lead to the proposal of an emerging theory titled the *Acts of Agency* theory (proposed in Section 6.2.4). This theory further extended and integrated the previous models, including the *Sphere of Influence (SoI)*, *Events of Interaction (EoI)* and *Five Acts of Agency (FAA)*.

Chapter 6 also discussed the value of using the *Five Acts of Agency* model in an applied manner. Existing strategies and initiatives aiming to foster women's participation can be developed from, or evaluated by, using the *Five Acts of Agency* model. Eleven recommendations are made, with each recommendation providing evidence of how agent-driven mechanisms can foster women's participation in the DCI.

Therefore, the two research questions, posed at the conclusion of Chapter 2—‘What are the influences on women's participation in the DCI?’, and ‘How can these influences be understood?’—were addressed by developing and then applying a series of three frameworks to the analysis of empirical data. This process has resulted in an understanding of the influences on women's participation in the DCI through the development of three new models: (1) the *Sphere of Influence (SoI)*, (2) the *Events of Interaction (EoI)*, and (3) the *Five Acts of Agency (FAA)*, and an emerging theory titled the *Acts of Agency* theory. The remainder of Chapter 7 summarises how the research addressed the research problem and the research questions.

Section 7.1, explains how the research contributes to systematically addressing the two research questions and the research problem. Section 7.3 summarises the empirical, theoretical, methodological and applied contributions. There are limitations to the findings and conclusions, and the need for future research is not surprising as the nature of exploratory research is to reveal more questions than it answers. As Section 7.4 concludes, these limitations, in many instances, inform the direction for future research.

7.1 ADDRESSING THE RESEARCH PROBLEM

The research problem addressed by this research was ‘Why do women participate in the Australian Digital Content Industry (DCI)?’ Two key research questions addressed this research problem. Question 1 asked, ‘What are the influences on women's participation in the DCI?’, and Question 2 asked ‘How can these influences be understood?’

Employing an exploratory case study approach, the scope of the investigation focused on women's participation within games and multimedia organisations in Brisbane (Queensland, Australia). The city of Brisbane was, at the time of the investigation, the second largest digital games hub in Australia (as noted in Section 4.1.1). The primary empirical data collected for the case study included semi-structured interviews with 18 women (employed as interactive content creators in 11 different games and multimedia organisations), and three industry stakeholders (including a male DCI worker and a male employer). Secondary data included over 60 individual samples of data, such as excerpts from websites and industry reports relevant to the DCI.

Underpinned by a Critical Realist ontology, the case study aimed to provide empirical, theoretical, and explanatory insights into the research problem.

7.1.1 THE INFLUENCES ON WOMEN'S PARTICIPATION

The findings support previous research that suggests women are under-represented in the DCI (as reported in the findings in Chapter 5). Analysis of the data using the three frameworks proposed in Chapter 3 reveals a range of influences on women's participation. The influences include those previously reported in both the DCI and ICT industry-related literature; influences such as other people (for example, parents), organisational cultural practices, media stereotypes and access to resources. In addition, the findings illuminate influences not noted in previous research, such as the type of clothing worn by DCI workers, which can signify gendered practices. The findings identify a wide range of social, cultural, mediated and resource influences that influence women's participation in the DCI context.

Many of these influences have been identified in the ICT literature. However, the findings add a deeper insight into the influences. Similar to previous research in the ICT literature, for example, the findings reveal that women in the DCI do face a workplace culture that fosters working long work hours. However, findings also reveal that the influences resulting from the interaction between the environment and person are complex and emergent. Although women in the DCI face expectations to work long hours, the actual influence of work hours differed. Not all interactive content creator roles entailed long working hours; the practice varied between DCI organisations, and the individual women themselves played a role in choosing to work long hours (See these findings in Chapter 5). Thus, in identifying what influences exist the research has also highlighted that there is need for a richer understanding of those influences. Care should be taken in making a blanket statement that 'long hours' are an influence. There is a range of influences on women's participation and these vary with regards to the environment and person.

This empirical data provides a valuable contribution, as there is little previous empirical research into women's participation in the DCI. However, to address the need (recognised in Chapter 2) for unified rather than fragmented insights, the research approach was further refined to identify influences, and to understand these influences in a unified manner.

7.1.2 THREE FRAMEWORKS WITH WHICH TO IDENTIFY AND UNDERSTAND INFLUENCES

The application of three different frameworks to the analysis of multiple sources of empirical data resulted in the identification of existing influences and the further understanding of these influences. As Chapter 3 proposed, these three frameworks were: 1) analytical, 2) theoretical, and 3) ontological. The sequential application of each of the three different frameworks, to the analysis of empirical data, provided valuable insights into the influences on participation. Each framework revealed different influences and offered a way in which to understand these influences. **The development and application of these three frameworks (analytical, theoretical, and ontological) is an original approach to identifying and understanding the influences on women's participation in the DCI, and is a major contribution of this research.**

FRAMEWORK 1 (THE ANALYTICAL FRAMEWORK): E, P AND I

The first framework (analytical) was developed from a review of existing research (Section 3.1). The analytical framework fostered an investigation into three categories of influences: 1) Environment (E), 2) Person (P), and 3) the Interaction between E and P (I). Chapter 3 argued that there was a need to investigate two key categories of influences, the environment and the person. Previous research proposed that various sets of environmental factors and person characteristics could influence women's participation in either the ICT industry or the DCI. Analysis of the literature also suggested that investigating the interaction between the environment and person characteristics could be useful in understanding influences in a more holistic and integrated manner—with some researchers even suggesting that a focus on interaction was vital. Although approaches such as Trauth's *Individual Differences Theory of Gender and IT (IDT)* (Trauth et al., 2004) recommended that the interaction between influences be considered, little research directly focused on the interaction. Therefore, the first framework was developed in order to achieve this analysis.

Accordingly, the empirical data collected for the exploratory case study was analysed using the first framework. Through a process of pattern analysis, the empirical data was categorised into E, P or I categories. As presented in Section 5.2, this analysis provided a detailed granularity of the three categories in Framework 1. The Environment (E) was found to be comprised of four dimensions: 1) social, 2) cultural, 3) mediated, and 4) resource, with each dimension having several specific properties. The social dimension (1) included the properties of social agent (including parent, peer, and colleague) and social context (home, school, and work); the cultural dimension (2) included properties such as economy and language; the mediated dimension (3) included the property of medium; and the resource dimension (4) included properties such as

technology. Specific influences identified in the social dimension included the ratio of male to female colleagues in the workplace. The mediated dimension included the stereotypes conveyed by different mediums, including television. The resources dimension included access to technology, including computers, which could foster skill development.

The Person (P) category had only one dimension, social identity, which had two major properties, 1) occupational and 2) gender-related, and two minor properties, age and ethnicity. As discussed in Section 6.1, the ‘social identity’ concept in the Person (P) category helps to describe the person involved by recognising that, regardless of an individual’s qualities and capacities, one is initially judged by society’s social stereotypes, which can include gender stereotypes. The stereotypical views that an individual or other people have may influence or ‘filter’ the types of interactions a person experiences. Thus, a person’s social identity forms a type of a filter of experiences.

A woman faces gender stereotypes, such as their not being passionate about, or adept with, technology. Compounding the influence of gender stereotypes were the occupational stereotypes suggesting that DCI workers possessed a natural technical prowess. Thus, there were tensions between the two major properties, gender and occupation, within the social identity: Gender stereotypes suggest women are not technical, and occupational stereotypes suggest DCI workers require technical skills. As was discussed in Section 6.1, the two refined categories of E and P, and their dimensions and properties, are expressed as the *Sphere of Influence (SoI)* model.

Inductive analysis of the data for the third category in Framework 1, Interaction (I) between environment and person, proved more challenging because of its dynamic nature. As Section 5.2.3 explained, the research approach drew on the underpinning ontology, or more specifically on Bhaskar’s emphasis on recognising events (that individuals may or may not be aware of), to move beyond the analytical impasse. The empirical data supports this approach as participants’ accounts of their participation were often couched in terms of events. The refinement of the Interaction (I) category led to the identification of 10 events of interaction, which include gaining entry into the industry (‘Getting In’), negotiating salaries (‘The Catch 22’), and becoming a parent (‘Motherhood’); these are fully described in Section 5.2.3. As discussed in Section 6.1.4, these 10 events informed the development of a second model resulting from the analysis of empirical data using Framework 1: the *Events of Interaction (EoI)*.

Thus, the key contributions resulting from the analysis of the empirical data, using Framework 1, were the development of two conceptual models: 1) the *Sphere of Influence (SoI)*, which illuminates the environment and person characteristics that may influence women; and 2) the *Events of Interaction (EoI)*, which illuminates particular

events over a person's lifetime. The *SoI* provides descriptions of the dimensions and properties of the Environment (E) and Person (P) characteristics that may influence women's participation; this, in turn, raised awareness of the nature of the Interaction (I) between these two categories. The *EoI* model extends the description fostered by the *SoI* by highlighting key events of Interaction (I) between the E (Environment) and Person (P). Together, the models begin to offer a unified approach to identifying the influences on women's participation that manifest in the interactions between the environment and the person.

The analysis of empirical data using the analytical framework, and the two resultant models, helps provide a richer understanding of why women participate in the DCI. There were two key strengths of employing Framework 1. The analytical framework fostered the development of models to organise insights, and then provided a body of existing research with which to compare findings. As discussed in Chapter 6, the analysis of empirical data using the analytical framework helped reveal many influences that previous research had identified, and this strengthens the likelihood that those influences are involved in women's participation.

The two models emerging from Framework 1 also provide a unified approach to understanding the influences on women's participation. There are four strengths of the two models: 1) they help avoid essentialist propositions about gender, 2) they allow for linkages between macro and micro-level influences, 3) they provide insights that are complementary to the underpinning ontology; and 4) they allow for influences to be considered with regards to their temporality. First, in offering a description of the Person (P) category, an overriding concern of this research has been to avoid any essentialist propositions regarding gender. Indeed, the choice of the term 'person' offers a non-gendered label. Second, as discussed in Section 6.1, the models encourage analytical linkages, which can offer a deeper level of insight or a more unified understanding of influences. The Environment (E) can be considered across different levels, both the macro (for example, global or national) and micro level (for example, local setting such as organisation), thus highlighting links between influences such as global economic trends (macro) and the local hiring practices (micro). Third, both models provide insights into Bhaskar's 'empirical' and 'actual' domains of reality by illuminating both the experiences of individuals and the events that they may or may not be aware of. Fourth, both models begin to recognise that influences manifest within a temporal context. The *SoI* proposes that certain social agents within the social dimension of the environment, such as parents, may exert a stronger influence on women's participation at certain stages in their lives (for example, in childhood, as discussed in Section 6.1). The *EoI* recognises that events, such as gaining skills, occur over a lifetime, from early

childhood through to adulthood when a person is in the workforce. These models help form a richer view and foster a holistic understanding of the influences on women's participation.

The evidence presented and discussed in Chapters 5 and 6, and summarised in the section above, shows that the *Sphere of Influence (SoI)* and the *Events of Interaction (EoI)* models are key contributions of this research. Their development and application has enabled a richer understanding of the influences on women's participation. The evaluation of their contribution shows that the use of the two interrelated analytical models has been useful in providing that understanding. However, both these models primarily facilitate description of the influences. While rich descriptive insights are a valuable contribution, there are limitations to description alone. Thus, there were benefits in applying the second framework, the *Human Agency Multi-Theory Scaffold (HAMTS)* and the third framework, Bhaskar's three domains of reality (or the ontology of Critical Realism), as both facilitate further theorisation and explanation (rather than description) of the influences.

FRAMEWORK 2 (THE THEORETICAL FRAMEWORK): HUMAN AGENCY MULTI-THEORY SCAFFOLD (HAMTS)

The second framework was a theoretical framework comprised of concepts from four Human Agency theories (as proposed in Section 3.2). Chapter 3 argued that agency theory offered a suitable approach with which to investigate the interactions between the environment and the person. Chapter 3 also emphasised the methodological implications of choosing which theory, or theories, to use as a scaffold. In response, the concept of the *Multi-Theory Scaffold (MTS)* was proposed. The *MTS* is a methodological tool that guides the use of more than one theory as a scaffold. The strength of the *MTS* is that it encourages more than one theory to be used, as different types of theories (such as meta, critical, middle-range and operationalised theory) foster different types of understanding. Although the *MTS* could employ various theories, in this research, the *MTS* was populated with Human Agency theories, and this *Human Agency Multi-Theory Scaffold (HAMTS)* forms the basis of Framework 2. As identified in Section 3.2.4, Framework 2 is comprised of 11 concepts selected from the following four Human Agency theories: 1) the meta theory of Giddens' *Structuration Theory (ST)*; 2) the critical theory of Connell's *Social Theory of Gender (STG)*; 3) the middle-range theory of Bandura's *Social Cognitive Theory (SCT)*; and 4) the operationalised theory of Lent et al.'s *Social Cognitive Career Theory (SCCT)*. **The *MTS* is a further key theoretical contribution emerging from this investigation.**

Accordingly, the empirical data collected for the exploratory case study was analysed using the second framework. Through a process of pattern analysis, the empirical data was categorised into 11 categories (the agency theory concepts), including norms, power, transgression, and self-efficacy. As presented in Section 5.2, the examination of the data using the *HAMTS* revealed that there was empirical evidence to support each of its concepts. Thus, Human Agency theory offered a useful theoretical perspective with which to analyse empirical data to help reveal both a diverse range of influences, and to offer a way to understand women's participation.

The concepts in the *HAMTS* also challenged the empirical data, and the tensions between existing theory and the empirical data strengthened the development of original theoretical insights. For example, although *ST* (Giddens, 1984) and *SGT* (Connell, 1987) emphasise the role of societal power, there were few examples of this type of power in the empirical data. In contrast, the participants' comments were interpreted as emphasising individual power, which ultimately led to a focus on the causal capacity of the individual. Thus, analysis of the empirical data, using agency theories, began to emphasise the role a person played in regards to their participation. This theoretical perspective proved central when synthesising the findings.

Previous research into women's participation did not draw heavily on Human Agency theory, even though previous research in the ICT literature alluded to the relevance of this theory (as Section 3.2.3 noted). Therefore, this investigation has provided a new and fruitful theoretical base from which to understand the phenomenon of women's participation in the DCI. Specifically, two key conclusions emerge from the application of Framework 2. The first conclusion relates to the value of a *MTS* to the research process, and the second relates to the value of agency theory in addressing the research problem. As discussed in Section 6.1.6, the *MTS* made three primary contributions to the research process: 1) *sensitised* the researcher to the phenomenon under investigation by offering a wider range of concepts for consideration; 2) assisted in the *analysis* of empirical data; and 3) fostered *theorising* about the phenomenon. The *MTS* fostered different levels of abstraction and strengthened the theoretical triangulation between data and theory, which led to greater levels of confidence in the findings and the research outcomes. Second, agency theories (within the *HAMTS*) offered a range of concepts that drew attention to influences, such as power, not readily identified from empirical data. In addition, agency theories fostered further understanding of influences. For example, where Framework 1 identified the role of resources, agency theories explained why these resources could influence participation. The value of employing more than one agency theory was that different theories offered different explanations of influences. Where Giddens emphasises the role of power when accessing resources,

Bandura emphasised that access to resources plays a role in a person's self-efficacy. The use of the *HAMTS*, therefore, addresses the call in the literature for a theoretical understanding of the phenomenon of participation by facilitating an empirically grounded explanation of the phenomenon.

Chapter 3 foreshadowed many of the benefits that emerged from the employment of the *HAMTS* in the research. An unexpected benefit was the value of using Human Agency theory to abstract the underlying mechanisms. That is, the concepts from Framework 2 helped reveal the mechanisms that Framework 3 aimed to identify. The complementary nature of Frameworks 2 and 3 is summarised shortly.

FRAMEWORK 3 (THE ONTOLOGICAL FRAMEWORK): BHASKAR'S THREE DOMAINS OF REALITY

The third framework was the ontological framework, comprised of three concepts, the 'three domains of reality' proposed by the Critical Realist Bhaskar (1978, 1989): 'empirical, actual and real' (See Section 3.2). Chapter 3 argued that there was a need for a multi-paradigmatic, deeper understanding of influences. Critical Realism's emphasis on the abstraction of mechanisms underlying people's experiences appeared to offer a suitable philosophical or ontological perspective. In addition to specifically employing Bhaskar's concepts in Framework 3, the research process itself was underpinned by a Critical Realist ontology.

Accordingly, the empirical data collected for the exploratory case study was analysed using the third framework. Through a process of pattern analysis, the empirical data was categorised into three types: 1) empirical, 2) actual, and 3) real. As presented in Section 5.2, this analysis revealed mechanisms underlying the interactions between the environment and person. Although Bhaskar's 'empirical' domain encouraged a description of the entities such as environment and person, earlier data analysis revealed that many of the entities in the empirical domain had been previously identified when using Framework 1 (as captured by the *SoI* model); consequently, there was no need to investigate the category further. Similarly, the consideration of Bhaskar's actual domain encouraged a description of events of which participants may or may not be aware. Data analysis using Framework 1 had also revealed the events (as captured by the *EoI* model), and no further analysis was conducted.

Investigating Bhaskar's real domain entailed the abstraction of mechanisms underpinning interactions; this (as Section 6.1.8 noted) proved more challenging. The abstraction was addressed using a number of analytical approaches. A key approach entailed following Danermark et al.'s (2002) recommendation that existing theory (utilising an abductive logic) be used. Although the *HAMTS* had not explicitly considered

mechanisms, the agency theories (in Framework 2) drew attention to the causal capacity of individuals. This insight and further analysis of the empirical data (utilising retroductive logic) led to the abstraction of mechanisms in general, and of agent-driven mechanisms in particular. Agent-driven mechanisms are driven by the individual, in contrast to those that arise from the environment. Therefore, the influences on women's participation include agent-driven mechanisms, as the following section will further clarify. Therefore, Critical Realism and, more specifically, Bhaskar's 'domains of reality' offered a useful approach to describing the phenomenon of women's participation by identifying influences and in understanding these influences; it also offered a useful approach (based on causal tendencies) to explaining why women participate in the DCI.

THE AGENT-DRIVEN MECHANISMS

As noted, each of the three frameworks revealed different types of influences; this was because each individual framework offered a different perspective with which to analyse the empirical data and understand the influences on women's participation. Although each framework illuminated different influences, there were common findings across all three—each investigated the interaction between the person and their environment, and each revealed that the individual plays an important role in their participation.

The first framework, informed by existing research, recognised that it is integral to consider the interaction between the environment and person. Analysis of empirical data using Framework 1 revealed that both the characteristics of the environment and person play a role in participation.

The second framework, informed by existing agency theory, inherently offered several specific concepts (such as self-efficacy) to explain interaction between the person and their environment. Analysis of empirical data using Framework 2 revealed how the person (or the agent) has a potentiality for causal action.

The third framework, informed by a Critical Realist ontology, offered three concepts, with an emphasis on mechanisms that underpin the interaction between the person and their environment. Analysis of empirical data using Framework 3 revealed that mechanisms include those that arise from the causal effect of the person.

Through the conduct of the research, it became apparent that, although each framework helped to identify certain types of influences, it was the synthesis of the insights from the application of each framework which was most helpful in addressing the research problem. This synthesis led to the original conceptualisation of agent-driven mechanisms.

The key, original contribution from the synthesis of insights from the application of the three frameworks was the conceptualisation of agent-driven mechanisms. Agent-driven mechanisms provide an original means of explaining women's participation. The conceptualisation of agent-driven mechanisms is encapsulated in the development of both a model and an emerging theory. The conceptual model—the *Five Acts of Agency (FAA)* – provides a relational, conceptual model, which identifies 10 agent-driven mechanisms that underlie the emergent interactions between the person and their environment. The 10 agent-driven mechanisms are: 1) accessing, 2) imagining, 3) doing, 4) belonging, 5) sharing, 6) problem-solving, 7) transforming, 8) emotion, 9) ethical, and 10) being (See Section 6.3.3). The agent-driven mechanisms conceptualise the causal effect an individual may have when interacting with their environment. For example, individuals can harness agent-driven mechanisms (such as collaborating and problem solving) to foster their participation.

Although women face constraints and supports (from both their environment and themselves), they also play an integral role by having a causal effect on their participation. Participation is a result of an individual's actions (or inaction) in response to the environmental characteristics and their personal characteristics. Where previous research focused on the overwhelming circumstances women face in regards to their participation, the concept of agent-driven mechanisms recognises that both the constraints and supports are, to some extent, in the hands of the women themselves. Women are not positioned as hapless victims; they can, and do, have the capacity to have a causal effect—to challenge the circumstances in which they find themselves. Thus, the agent-driven mechanisms, as conceptualised in the *Five Acts of Agency (FAA)*, can influence women's participation in the DCI. **The conceptualisation of the 10 agent-driven mechanisms, in the *Five Acts of Agency (FAA)* model, is the key contribution emerging from this research.**

Further theoretical advancement of the concept of agent-driven mechanisms involved the proposal of an emerging theory, the *Acts of Agency* theory. The theory provides further explanation of women's participation in the DCI by integrating the three models that emerged from the findings: 1) *SoI*, 2) *EoI*, and 3) *FAA*. Used sequentially, each model reveals different influences, moving from a surface description of characteristics through to a deeper account of underlying mechanisms. The *SoI* identifies the characteristics of the environment and person that may influence participation. The *EoI* identifies events (where the environment and person interact) that may influence participation. The *FAA* identifies the mechanisms (which manifest in the interaction) that a person can employ to influence their participation. Additionally, the theory extends the three models by introducing the elements of the agent's actions, reflection and

temporality (as discussed in Section 6.2.4). This theorisation draws heavily on both Human Agency theory and Critical Realism literature. The central premise of the *Acts of Agency* theory, then, is that although participation involves both the environment and person, the causal effect of the individual is central.

There are two major benefits of using agent-driven mechanisms to understand women's participation: 1) a causal explanation and, 2) a non-essentialist perspective. The first benefit is that they move findings beyond a description of a phenomenon towards an explanation of women's participation. Describing the influences on participation is important, and this research has achieved that by analysing the empirical data and proposing models such as the *SoI* and *EoI*. However, this research also found that the interactions between the influences in the environment and the person manifest in a mutable and dynamic manner, which inhibits a definitive description of their influence on participation. Agent-driven mechanisms are able to reduce this complexity by recognising the causal tendencies. In the context of this research, the *Acts of Agency* theory suggests that even though individual women may have different experiences, potentially all may draw on this set of agent-driven mechanisms to foster their participation.

The following example serves to illustrate how agent-driven mechanisms foster a causal explanation of the phenomenon of women's participation. Framework 1 found that resources, such as computers, are part of the group of environmental influences (resources are one of the four dimensions of the *SoI* model) that foster participation. The analysis also found that these resources assist women to develop skills and self-efficacy and, ultimately, to challenge the gender stereotypes that they experience (as illustrated by the event 'Learning Recipes' in the *EoI* model, and further explained by drawing on the agency theories in Framework 2). The *SoI* and *EoI* models facilitated a descriptive account of the different types of resources (for example, computer models and software packages) within the environment category, and a range of individuals within the person category (for example, different ages, personal backgrounds, and roles as interactive content creators). Agent-driven mechanisms (in the *Five Acts of Agency* model) provide a further explanation of the influences of resources by acknowledging the causal effect of the individual. For example, when a woman (person) uses a resource, such as software, the mechanism of 'doing' (that is acquiring and practising skills) occurs. The agent-driven mechanism of 'doing' occurs regardless of the type of resource (which can change) or characteristics of particular individuals (which can also vary). Thus, agent-driven mechanisms reveal underlying causal mechanisms, rather than surface accounts only.

The second benefit of agent-driven mechanisms is that they offer a non-essentialist approach to understanding the causal effect of individuals. Although an individual characteristic such as gender is acknowledged in the *SoI* (and, consequently, as a component of the *Acts of Agency* theory), gender itself is not viewed as the only reason a person may or may not participate. The characteristic of gender gives rise to other influences, including the stereotypes a person faces which might constrain their capacity to feel as though they belong. However, in response, a person can find ways (through their actions) to overcome these constraints. For example, an individual recognising that they face exclusion in the workplace due to their gender may actively seek access to resources that will minimise this exclusion. Following the *Five Acts of Agency* model, they would (in this instance) be employing the mechanism of ‘accessing’.

Thus, although women may face limited access to resources, their participation to some extent lies in their own hands as individuals. However, women are not to be held entirely accountable for their participation. They are not responsible for the gender stereotypes they face, or the ‘old boys’ networks that impede their access to resources. Although the *Acts of Agency* model acknowledges that participation is within the control of individual agents, women’s participation should always be considered with reference to the characteristics of the environment.

COMPLEMENTARY FRAMEWORKS

The synthesis of insights from the data analysis, which lead to the original conceptualisation of agent-driven mechanisms, arose from the complementary aspects of the three frameworks. All three frameworks focused the analysis of the empirical data on the interaction between the environment and person (as Chapter 3 detailed). Further complementary aspects of the three frameworks emerged during the research process. First, there was a complementary focus between the analytical framework (Framework 1) and the first two domains of reality proposed by the philosophical framework (Framework 3). Framework 3 entailed the analysis of empirical data using the concepts of the three domains of reality: 1) empirical, 2) actual, and 3) real. The empirical domain seeks to identify the experiences of people, and the actual domain seeks to identify events of which people may or may not be aware. The *SoI*, a model emerging from the refinement of Framework 1, provided an insight into the empirical domain, as the *SoI* entailed the interpretation of participants’ accounts of their experiences. The *EoI* model provided an insight into the actual domain of reality, as the *EoI* fosters a description of events that participants experience, but of which they may not be aware. The findings from the analysis of empirical data utilising the analytical framework (Framework 1) were of assistance when analysing data using the ontological framework (Framework 3).

Importantly, this complementary aspect links previous research (recognised by Framework 1) and an ontological stance (Framework 3).

Second, there was a complementary focus between the theoretical framework (Framework 2) and the third domain of reality, the real domain, in Framework 3. The real domain seeks to identify the mechanisms underpinning the experiences of people. Accordingly, Framework 3 entailed the analysis of empirical data to allow for the abstraction of the mechanisms underlying the interactions between the environment and person. As discussed in Chapter 6, although the ultimate aim of a Critical Realist ontology is the abstraction of mechanisms, in practice, there are challenges in this process (See Section 6.2.6). Following recommendations by Danermark et al. (2002), different forms of logic were employed; these included an abductive logic when drawing on theory to abstract mechanisms from the empirical data, and a retroductive logic when abstracting mechanisms from the empirical data. The investigation found that both the empirical data and the Human Agency theories from Framework 2 assisted in the abstraction of mechanisms. However, Human Agency theories proved to be particularly useful in the abstraction of mechanisms as they illuminated the causal capacity of the individual. Although Human Agency theories do not specifically offer causal mechanisms (in a Critical Realist sense), the theories sensitised the researcher to the underlying causal mechanisms at play in the interaction between Environment (E) and Person (P) through concepts such as structuration (Giddens, 1984), reciprocal relationships (Bandura, 1986), and causal pathways (Lent et al., 1994). Thus, there was a complementary aspect between the theoretical framework (Framework 2) and the ontological framework (Framework 3). The findings from the analysis of empirical data utilising the theoretical framework (Framework 2) were of assistance when analysing data using the ontological framework (Framework 3). These conclusions suggest that not only are there parallels between Human Agency theory and Critical Realism in a theoretical sense, but that the different perspectives also offer a complementary approach in practice.

In addition, the models developed from the application of the three frameworks appear to align with Danermark et al.'s (2002) six-stage model of explanation. Both the *SoI* and *EoI* provide insights into Stages 1 and 2 of Danermark et al.'s (2002) model, because they foster a description of the entities involved in the phenomenon, help organise insights, and provide a resolution of data. As discussed in Chapter 6, the *MTS* is beneficial in Stage 3 of Danermark et al.'s (2002) model. Where Danermark et al., (2002) emphasised the role of existing theory, the *MTS* provides a guide to the use of multiple theories. The strength of the *MTS* is that more than one theory can foster the abstraction of a wider variety of mechanisms. In this way, the *MTS* could well be

expanding the work of Danermark et al. (2002). The *FAA* model and *Acts of Agency* theory align to Stages 5 and 6 of Danermark et al.'s model, where the emerging conceptualisation of agent-driven mechanisms is supported by both empirical data and further theoretical work.

The use of the three frameworks in an integrated manner provided a valuable approach through which to understand the influences on women's participation and, ultimately, to understand why women participate in the DCI. The application of an analytical framework built on existing research (Framework 1), facilitated the development of two of the new models that arose from this research: the *SoI* and the *EoI*. The *SoI* captured the environment and person characteristics, and the *EoI* illuminated events where the environment and person interact. However, the application of Framework 1 also confirmed the need for a different approach with which to better understand the interaction between influences, hence supporting the value of the following two frameworks. The application of the *Human Agency Multi-Theory Scaffold HAMTS* (Framework 2) confirmed the value of using theory to inform the research process, and specifically confirmed the value of using multiple Human Agency theories to understand the influences on women's participation. The value of using Critical Realism as an ontological framework (Framework 3) lay in the abstraction of mechanisms, which provided a form of explanation of women's participation. Individually, each of these frameworks offered a different approach to understanding the influences on women's participation; however, together, they offered a deeper, unified understanding of the research problem.

7.2 CONTRIBUTION

Addressing the research problem and research questions resulted in four principle forms of contribution: 1) empirical, 2) theoretical, 3) methodological, and 4) applied. Empirical contributions include a volume of rich data, mostly sourced from the accounts of women who work in the DCI. The *SoI* and *EoI* models helped to organise this empirical data. Theoretical contributions include the original conceptualisation of agent-driven mechanisms, encapsulated in the *FAA* model and in the emerging theory of *Acts of Agency*. The methodological contribution includes the development and application of the *Multi-Theory Scaffold (MTS)* –an analytical tool for choosing different types of existing theories when using a theoretical scaffold. The applied contribution includes the apparent usefulness of the proposed agent-driven mechanisms as a way to plan and evaluate strategies supporting women's participation.

1) EMPIRICAL CONTRIBUTION

This research provided an empirical contribution through the conduct of an exploratory case study. The case study entailed collection of multiple sources of empirical data, including semi-structured interviews with women working in the DCI and stakeholders from the industry. Secondary data included excerpts from websites, the media, and industry documents (as summarised in Appendix 17). Analysis of the empirical data resulted in rich descriptive insights into the phenomenon, including characteristics of the context (Australian DCI) and the population involved (women working in the DCI). Insights reveal a range of influences on women's participation such as long work hours, gender and occupational stereotypes, and the availability of resources. Such descriptive insights are particularly valuable as there has been little prior empirical research on the participation of women in the specific context of the Australian DCI. To the author's knowledge, this is the only dissertation and only the second academic study in the last decade [Roan and Whitehouse's (2007) study was the first] to explore women's participation in the Australian DCI.

2) THEORETICAL CONTRIBUTION

This research provided a theoretical contribution through the synthesis of empirical data, concepts from previous research, the perspective of Human Agency theory and a Critical Realist ontology. This synthesis has led to the development of four empirically derived, theoretically driven models: 1) The *Sphere of Influence (SoI)*; 2) The *Events of Interaction (EoI)*; 3) The *Five Acts of Agency (FAA)*; and 4) the emerging theory of *Acts of Agency*. The *SoI*, *EoI*, and the *FAA* support the emerging theory of *Acts of Agency*, which in turn, provides a starting point for further theorisation.

3) METHODOLOGICAL CONTRIBUTION

This research offers a methodological contribution in two ways: first, the investigation provides an exemplar of an empirical, exploratory case study underpinned by Critical Realist ontology (of which, as Chapter 4 noted, there are few); second, the investigation presents an original approach to employing multiple theories in a theoretical scaffold. With respect to the first contribution, the study illustrates the argument for using both a case study approach and the ontology of Critical Realism: both value multiple sources of evidence and both foster empirical, theoretical and explanatory insights.

With regard to an empirical exploratory case study employing a theoretical scaffold (as outlined in Chapter 3), there are contentions surrounding the application of existing theory in a largely inductive case study. Embracing existing theory as a part of the research process can lead to questions about how original insights emerge from a study, or may suggest a repudiation of empirical realism. However, this study has argued

that a theoretical scaffold serves as a tool with which to understand the empirical data. It does not superimpose theory; rather, it stimulates theoretical insights from the empirical data. This investigation clearly articulated the use of existing theory as a scaffold and has developed and applied a *Multi-Theory Scaffold (MTS)*, a framework that embraces the strengths of using multiple theories to scaffold research by asking the researcher to consider the types of abstraction that different theories offer a study. The *MTS* is a valuable research tool for three key reasons; it can: 1) *sensitise* the researcher, 2) assist in *analysis* of empirical data, and 3) assist in *theorising* the phenomenon. The *MTS*, therefore, can be of value to researchers who are interested in using existing theory to scaffold research.

4) APPLIED

In addition to its academic merits, the research offers an applied contribution. Section 2.3 identified the need for theoretically informed interventions to foster the recruitment and retention of women, and to address issues of social inclusion of women as a minority group in society. The findings reveal that agent-driven mechanisms (in the *FAA* model) offer an approach to planning and evaluating strategies and interventions (as discussed in Section 6.3). For example, both the women in the current case study and previous research in the ICT domain have identified the need for role models. Women's access to suitable role models can foster their capacity to visualise or imagine their participation in industry and career pathways. In other words, the strategy of offering role models supports the individual's capacity for the agent-driven mechanism of 'imagining' (categorised in the 'Connected Act' within the *Five Acts of Agency* model); therefore, the agent-driven mechanisms help to explain why certain strategies can support women's participation.

7.3 LIMITATIONS OF THE RESEARCH

As with all research, findings must be interpreted with regard to their limitations. Several limitations have been noted and are now addressed.

One limitation is that in aiming for a non-essentialist approach to researching women's experiences, the investigation has distanced itself from an explicit focus on gender. However, gender is a central concern as evident by the choice of sample population (women) and the inclusion of a critical theory in the *MTS*, which has introduced the axiological considerations often associated with feminist literature. However, rather than being a limitation, this distancing from gender is the strength of the resultant models because they foster a non-essentialist approach. The *Sphere of Influence (SoI)* and *Five Acts of Agency (FAA)* models, therefore, can be transferred to research

concerned with the participation of other social identities (for example, ethnicity and age).

A further limitation is that the research approach requires a high level of skill on the part of the researcher. Critical Realism is viewed as an approach that is not suitable for a novice researcher (as noted in Pawson, Greenhalgh, Harvey & Walshe, 2004); rather, it is one that requires experience, both in research and in subject matter (Dobson et al., 2007). In response to this limitation, every effort was made to make the logic, methodological approach, and high level of researcher reflexivity apparent. Consequently, it is hoped that the considered choices that the researcher has made are evident in the investigation.

A further limitation of the research is that findings report a diverse and complex range of influences, and an in-depth discussion of all of these influences was beyond the scope of this dissertation. Such constraints resulted in surface, rather than deep accounts of certain influences. Further consideration of how the characteristics of the environment, such as work practices (for example, work hours and the typical clothing of DCI workers), and physical features of the environment (for example, open space layout of workplaces) is required. A similar limitation of the applied outcomes is that only a few strategies were discussed (in Chapter 6). In response to this limitation, there is a need for further research which reduces the depth or breadth of enquiry, or which focuses on specific influences.

A further limitation lies in identifying the influences pertinent to the DCI context. Many of the influences that this study identified have surfaced in previous research in the ICT related literature. Nuances were noted in the discussion; however, further consideration of the DCI specific influences is required.

There are also limitations to the models emerging from the application of the frameworks. The *Sphere of Influence (SoI)*, *Events of Interaction (EoI)*, *Five Acts of Agency (FAA)*, and emerging theory of *Acts of Agency* are what Layder (1998, p.78) described as “interim products”. In other words, there remains the possibility for revision of these models and theory in the light of further evidence. For example, further research may reveal other dimensions and properties of the *SoI* model. Similarly, the ten events identified in the *EoI* model are relevant to the particular sample of women interviewed for this investigation; further interviews with other DCI women could reveal other events. Thus, this investigation presents inferences rather than definitive conclusions, and alternative interpretations are always possible.

Similarly, any conclusion regarding the explanatory strength of Human Agency theories must consider the methodological concerns regarding the use of existing theory. This includes acknowledging that no one theory can provide an ultimate explanation of

such a dynamic and complex phenomenon as participation. In response to this limitation, there is the need to reiterate that the strength of a theoretical tool such as the *MTS* is that it does not recommend a specific theory; rather, it asks the researcher to consider which theories, based on their level of abstraction, are useful to the research problem at hand. This would not necessarily entail using agency theory; a researcher can use any theory in the *MTS* that they view as relevant. The *MTS* simply asks the researcher to recognise that different types of theories may lead to different insights. Even though agency theories appear relevant to the research problem, other theories may be just as fruitful.

7.4 FUTURE RESEARCH OPPORTUNITIES

The limitations outlined above offer opportunities for further research. Areas of future research, or what Layder (1998) might describe as “offshoots”, include the in-depth research of specific influences (such as culture), and further development of the models. As noted earlier, the need for future research is not surprising, as the nature of exploratory research is to reveal more questions than it answers. Table 54 summarises future areas of research noted throughout the dissertation; these are as follows.

The research provides a valuable insight into a wide range of influences. Future research could refine these substantive insights, including greater in-depth consideration of specific influences identified from the empirical data, such as work hours. There is also a need for further expansion of specific concepts, including identity filter, gender triggers, and temporality.

The research will be of value to other researchers investigating participation. Although the *Acts of Agency* is a substantive theory developed from the study of one area of investigation (participation) within a specific context (Australian DCI) and population (female interactive content creators), there is scope for application of the emerging theory (and the associated models) to other research problems and domains where the aim is to understand the phenomenon of participation. As the models recognise social identity, rather than fixed traits such as gender, they should be useful in research that considers participation by other identities (such as male, older workers), and within other contexts and industries.

The research provides several models, which individually and together offer a way to understand women’s participation in the DCI. Future research could employ the models as sensitising devices for future research. Both the *SoI* and *EoI*, as theoretical tools, can sensitise the researcher to environment, person and interaction characteristics that may influence women’s participation. Similarly, the *FAA* can serve as a sensitising device for future research investigating mechanisms. This may entail the *FAA* model

forming an explicit analytical framework for further collection and analysis of empirical data.

The models provide a strong basis for theorisation. Future research could extend the theoretical tools emerging from this research through further empirical and theoretical research.

Table 54 Examples of future areas of research resulting from this dissertation

Future area of research	Examples as noted in the dissertation
Further empirical work to investigate specific influences	<ul style="list-style-type: none"> -Future research could use a sampling strategy where the differences between the games and multimedia organisations can be further investigated -Future research could focus on specific influences such as gender and occupational stereotypes, work practices (such as working hours) and the occupational segregation women face in the DCI -Future research could focus on specific influences such as women's responses to the tensions between gender and occupational identity
Further work to refine specific concepts	<ul style="list-style-type: none"> -Future research could refine the conceptualisation of several of the mechanisms, such as creativity -Future research could consider how the different properties of the 'social identity' dimension in the <i>Sphere of Influence (Sol)</i> model filter participation experiences -Future research could refine the element of temporality in the <i>Sphere of Influence (Sol)</i> model, and the emerging <i>Acts of Agency</i> theory
The <i>Sphere of Influence (Sol)</i> model and <i>Events of Interaction (Eol)</i> model	<ul style="list-style-type: none"> -Further research could consider the relationships between the different contexts or settings of interaction, other than the workplace setting that this case study focused on (for example, future research may consider the relationships between the Community of Practice (CoP) and other settings) -Further data is required for a more detailed description of specific properties in the <i>Sphere of Influence (Sol)</i>, such as policy and legislation
The <i>Multi-Theory Scaffold (MTS)</i>	<ul style="list-style-type: none"> -Future research could further develop the <i>Multi-Theory Scaffold (MTS)</i> as a methodological approach -Future research could further develop or modify the <i>Human Agency Multi-Theory Scaffold (HAMTS)</i> by considering other agency theorists, such as Emibayer and Mische (1998)
The <i>Five Acts of Agency (FAA)</i> model	<ul style="list-style-type: none"> -Future research could collect further empirical evidence to support the conceptualisation of agent-driven mechanisms -Further research could consider the relationships between the mechanisms in the <i>Five Acts of Agency</i> model -Future research could investigate if the mechanisms presented in the <i>Five Acts of Agency</i> are pertinent to the participation of other social identities, including gender (males), ethnicity and age -Future research could consider the mechanisms identified in the <i>Five Acts of Agency</i> from a lifespan perspective
The emerging <i>Acts of Agency</i> theory	<ul style="list-style-type: none"> -Further theoretical work could develop the emerging theory by considering previous research that explores the linkages between Human Agency theory and Critical Realism

7.5 FINAL COMMENT

The research presented in this dissertation has contributed to the scholarly work that considers the phenomenon of women's participation in the Digital Content Industry (DCI). The research addresses the gap in the literature by presenting an exploratory case study, in which multiple sources of empirical data are analysed using three frameworks: an analytical, theoretical, and ontological framework. The findings from the analysis reveal there is a range of influences on women's participation in the DCI. These influences can be understood by using the original concept of agent-driven mechanisms.

I believe that this research offers an original research contribution. The personal goal was to embrace creativity and imagination, while adhering to quality requirements. As Mir & Mir (2002) remind us, we need the sociological imagination that Mills (1959) argued for. Overall, the research establishes a body of knowledge about the phenomenon of women's participation within the Australian DCI, and contributes a valuable point of reference for future endeavours that seek to understand the phenomenon. Furthermore, the research may act as a catalyst for further research in this important area, or the resultant models could prove to be useful tools for those researching participation in other industries or contexts.

Danermark et al. (2002) remind us that the world is changing. On a personal note, I welcome change regarding women's participation in the DCI. I hope that in a decade there will be no need to revisit the research problem; that the phenomenon of women's under-representation is consigned to being merely a historical record. Indeed, in the course of undertaking the research, I have had stakeholders suggest that the issue of women's under-representation will eventually resolve itself; even participants note that *slowly, bit by bit more females are starting to join the industry (G2)*. The question I am then left with is 'How long will it take?'

As I sit and watch my seven-year-old daughter playing *Fruit Ninja* with great gusto on her iPad, I notice the sticker on the back of the device.¹⁰⁵ It reads, 'Distributed by the Office for Women (Queensland State Government) in March 2012 for International Women's Day'. The accompanying slogan proclaims that 'Anything is Possible'. Yes, anything is possible—eventually. I wonder if my daughter will have cause to ask me in a decade, "Mum, why are there so few women working in multimedia and game production organisations?"

¹⁰⁵ The iPad was unveiled in January 2010 and became available to the public three months later. The sales of the iPad2 reached 4.69 million in March 2011 and approximately 50 million in January 2012 globally. Fruit Ninja was one of the highest grossing app games on iTunes in 2010.

References

- Aaker, D.A., Day G.S. & Kumar V. (1998). *Marketing Research*. 6th ed. John Wiley & Sons, New York.
- Abhayaratna, J. & Lattimore, R. (2006). Workforce Participation Rates - How Does Australia Compare? Staff Working Paper. *World Wide Web Internet and Web Information Systems*, (December).
- Ackroyd, S. & Fleetwood S. (2000). Realism in contemporary organisation and management studies. In *Realistic Perspectives on Management and Organisations*, S. Ackroyd & S. Fleetwood (Eds), Routledge, London, 3-25.
- ACS Australian Computer Society Ageism taskforce (2010). *Improving age diversity in the ICT workforce*, report, July 2010.
- Adam, A., Howcroft, D. & Richardson, H., (2002). Guest Editorial, *Information Technology and People*, 15(2), 94-7.
- Adam, A., Howcroft, D. & Richardson, H. (2004). A decade of neglect: reflecting on gender and IS, *New Technology Work and Employment*, 19(3).
- Adams, D. (2006). E3 Booth Babes Banned. Companies may have to rely on actual games to grab our attention. *IGN website*. Online article <http://au.ps2.ign.com/articles/683/683165p1.html>
- Adya, M. & Kaiser, K. M. (2005). Early determinants of women in the IT workforce: a model of girls' career choices, *Information Technology & People*, Vol. 18(3), 230-259.
- Agosto, D., Gasson, S., & Atwood, M. (2008). Changing Mental Models of the IT Professions: A Theoretical Framework. *Journal of Information Technology Education*, 7, 205-221.
- Ahuja, M. K. (2002). Women in the Information Technology Profession: A Literature Review, Synthesis and Research Guide, *European Journal of Information Systems*, 11, 20-34. Retrieved August 10, 2005 from <http://www.ingentaconnect.com/content/pal/0960085x/2002/00000011/00000001/3000417>
- AIMIA (2011). *Working in Australia's Digital Games Industry. Consolidation report*. Australian Research Council Centre of Excellence for Creative Industries and Innovation (CCI) and Queensland University of Technology in partnership with the Games Developers Association of Australia.
- AIMIA (Australian Interactive Media Industry Association). (2005). *Digital Content Industry Roadmapping Study*. Available at: http://www.aimia.com.au/i-cms_file?page=1455/Digital_Content_Roadmapping_Study_FINAL_AIMIA_Version.pdf
- Alexandrowicz, C. L. (2005). Gendered Work and Women's Domestic Investment: A Second Look at the "Stalled Revolution". *Annual meeting of the American Sociological Association*, Marriott Hotel, Loews Philadelphia Hotel, Philadelphia, PA Online Accessed 2009-05-25 from http://www.allacademic.com/meta/p22844_index.html
- Allaire, Y., & Firsirotu, M. E. (1984). Theories of Organizational Culture. *Organizational Studies*, 5(3), 193-226
- Allen, M. (2009). Historicising the Internet. *Oxford Internet Institute Summer Doctoral Program 2009*. <http://netcrit.net/content/oiihistorisinginternet2009.pdf>
- Alvesson, M. (1996). *Communications, Power and Organisation*, Walter de Gruyter: Berlin.
- Alvesson, M., & Karreman, D. (2007). Constructing mystery: Empirical matters in theory development. *Academy of Management Review*, 32, 1265-128.
- American Association of University Women (AAUW). (2004). *Under the Microscope: A Decade of Gender Equity Projects in the Science*. Washington DC: AAUW Educational Foundation. www.aauw.org
- American Game Career Guide. (2007). *Game Developer magazine*. Retrieved 30th August 2010 from website http://www.gamecareerguide.com/features/416/the_game_industry_salary_survey_2007.php?page=2

- Andersen, P. H., & Kragh, H., (2009). Sense and sensibility: Two approaches for using existing theory in theory-building qualitative research, *Industrial Marketing Management*, 39, 49-55.
- Andersen, V. & Gamdrup, P. (1990). Om problemformulering og projektarbejde. In Andersen, H. *Videnskabsteori og metodelære*. Frederiksberg, DK: Samfundslitteratur.
- Anderson, N., Lankshear, C. & Klein, M. (2006). Women in Information and Communication Technology (ICT) careers. *James Cook University, Education Queensland and Technology One*. Retrieved September 19, 2006 from http://www.soe.jcu.edu.au/cgi-bin/rws3.pl?FORM=Industry_Survey_Women_Wizard
- Archer, M. (1988). *Culture and Agency: The Place of Culture in Social Theory*, Cambridge: Cambridge University Press.
- Archer, M. (1995). *Realist Social Theory: the morphogenetic approach*. Cambridge: Cambridge University Press.
- Archer, M. (1998). Introduction: realism in the social sciences, in Archer, M.S., Bhaskar, R., Collier, A., Lawson, T. & Norrie, A. (Eds), *Critical Realism: Essential Readings*, Routledge, London, 189-205.
- Archer, M. (2000). *Being Human: The Problems of Agency*, Cambridge: Cambridge University Press.
- Archer, M. (2003). *Structure, Agency and the Internal Conversation*. Cambridge: Cambridge University Press.
- Archer, M. (2004). Emotions As Commentaries On Human Concerns, in J.H. Turner (ed.), *Theory and Research on Human Emotions* (Advances in Group Processes, Volume 21), Emerald Group Publishing Limited, pp.327-356
- Archer, M. (2007). *Making our Way Through the World*, Cambridge University Press, Cambridge.
- Archer, M. (2010). [1982] 'Morphogenesis Versus Structuration: On Combining Structure and Action', *The British Journal of Sociology – The BJS: Shaping Sociology Over 60Years*: 225–52. [Originally published in 1982 British Journal of Sociology 33(4): 455–83.]
- Archer, M. S. & Bhaskar, R., Eds. (1998). Critical Realism: essential readings. *Critical Realism--interventions*. London, Routledge.
- Australian Bureau of Statistics (ABS). (2005). *Labour Force, Australia*, (Cat. No. 6202.0). ABS, Canberra.
- Australian Bureau of Statistics (ABS). (2007). *Work in selected culture and leisure activities report*, (Cat. No. 628 1.0). ABS, Canberra.
<http://www.abs.gov.au/ausstats/abs@.nsf/web%20pages/Citing%20ABS%20Sources#Publications>
- Australian Bureau of Statistics (ABS). (2008a). (Cat. No. 8515.0). *Digital Game Development Services, Australia*, ABS, Canberra. viewed 15 March 2009
<http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/8515.0Main+Features12006-07?OpenDocument>
- Australian Bureau of Statistics (ABS). (2008b). *Australian Culture and Leisure Classifications*. (Cat No. 4902.0). ABS, Canberra. viewed 10 October 2008
[http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4902.02008%20\(Second%20Edition\).?OpenDocument](http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4902.02008%20(Second%20Edition).?OpenDocument)
- Australian Government. (2004). *From reel to unreal: inquiry into the future opportunities for Australia's film, animation, special effects and electronic games industries*. House of Representatives Standing Committee on Communications, Information Technology and the Arts. Tabled: 21 June 2004.
- Australian Government. (2005a). *Inquiry into increasing participation in the workforce. Appendix E*. Standing Committee on Employment, Workplace Relations and Workforce Participation Committee activities. <http://www.aph.gov.au/house/committee/ewrwp/paidwork/report.htm>
- Australian Government. (2005b). *Inquiry into increasing participation in the workforce. Appendix D*. Standing Committee on Employment, Workplace Relations and Workforce Participation Committee activities. <http://www.aph.gov.au/house/committee/ewrwp/paidwork/report.htm>
- Bacharach, S. B. (1989). Organizational theories: Some criteria for evaluation. *Academy of Management Review*, 14: 496-515.

- Bakhshi, Hasan, Freeman, Alan, & Higgs, Peter L. (2012). A dynamic mapping of the UK's creative industries. NESTA, London.
- Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A. (1989a). Social Cognitive Theory. *Annals of Child Development*, 6, 1-60. (Vasta, R, ed). Greenwich, CT: Jai Press LTD.
- Bandura, A. (1989b). Human Agency in Social Cognitive Theory. *American Psychologist*, 44, 1175-1184.
- Bandura, A. (1991). Social cognitive theory of moral thought and action. In *Handbook of Moral Behavior and Development*. Kurtines WM & Gerwitz JL (eds). (Vol 1, p 45-103). Hillsdale, NJ: Erlbaum.
- Bandura, A. (1997). *Self-efficacy: The Exercise of Control*. New York: W. H. Freeman.
- Bandura, A. (1999a). A social cognitive theory of personality. In Pervin, L. & John, O. (Ed.), *Handbook of Personality* (2nd ed., 154-196). New York: Guilford Publications. (Reprinted in Cervone, D. & Shoda, Y. [Eds.] *The coherence of personality*. New York: Guilford Press.
- Bandura, A. (1999b). Social Cognitive Theory: An agentic perspective. *Asian Journal of Social Psychology*, 2, 21-41.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1-26.
- Bandura, A. (2002a). Growing Primacy of Human Agency in Adaptation and Change in the Electronic Era. *European Psychologist*, 7(1), 2-16.
- Bandura, A. (2002b). Social Cognitive Theory in Cultural Context. *Applied Psychology*, 51(2), 269-290.
- Bandura, A. (2002c). Social cognitive theory of mass communications. In J. Bryant, & D. Zillman (Eds.). *Media effects: Advances in theory and research* (2nd ed., 121-153). Hillsdale, NJ: Erlbaum.
- Bandura, A. (2003). On the psychosocial impact and mechanisms of spiritual modeling. *International Journal for the Psychology of Religion*, 13, 167-173.
- Bandura, A. (2006). Toward a Psychology of Human Agency. *Perspectives on Psychological Science*, 1(2), 164-180.
- Bandura, A. (2004). Selective exercise of moral agency. In Thorkildsen, T. A. & Walberg, H. J. (Eds.). *Nurturing morality* (37-57). Boston: Kluwer Academic.
- Bandura, A., Barbaranelli, C., Caprara, G. V. & Pastorelli, C. (2001). Self-efficacy beliefs as shapers of children's aspirations and career trajectories. *Child Development*, 72, 187-206.
- Barker, L. J., & Aspray, W. (2006). The state of research on girls and IT. In J. M. Cohoon, & W. Aspray (Eds.), *Women and information Technology: Research on underrepresentation* (pp. 3-54). Cambridge, MA: MIT Press.
- Bazeley, P (2007). *Qualitative data analysis with NVivo*. Sage Publications, London.
- Bazeley, P. (2009). Analysing Qualitative Data: More Than 'Identifying Themes' Submitted copy: *Malaysian Journal of Qualitative Research*, 2. Retrieved Oct 2010. http://www.researchsupport.com.au/More_than_themes.pdf
- Beasley, B., & Standley, T. (2002). Shirts vs. skins: Clothing as an indicator of gender role stereotyping in video games. *Mass Communication & Society*, 5, 279-293.
- Becker, G. S. (1985). Human capital, effort, and the sexual division of labor. *Journal of Labor Economics*, 3, Part 2, 33-58.
- Beekhuyzen, J. & Clayton, K. (2004). *ICT Career Perceptions: Not So Geeky?* Proceedings of the 1st International Conference on Research on Women in IT, Kuala Lumpur, 28-30.
- Beekhuyzen, J.P., Nielsen, S.H. & von Hellens, L. (2003). Challenging the dualisms in female perceptions of IT work. *The Australian Journal of Information Systems*, 10 (2), 105-114.
- Berger, A. (1995) *Cultural Criticism*. London: Routledge.

- Berger, P.L. & Luckmann, T. (1966), *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*, Doubleday, New York, NY.
- Bertaux, D. (Ed.). (1981). *Biography and society: The life history approach in the social sciences*. Beverly Hills, CA: Sage.
- Betz, N. E. & Hackett, G. (1997). Applications of self-efficacy theory to the career assessment of women. *Journal of Career Assessment*, 5, 383–402.
- Bhaskar, R. (1978). *A Realist Theory of Science*. (2nd ed.). Brighton: Harvester Press.
- Bhaskar, R. (1979). *The Possibility of Naturalism*, (1st Edition). Sussex: Harvester.
- Bhaskar, R. (1986). *Scientific Realism and Human Emancipation*. London: Verso.
- Bhaskar, R. (1989). *Reclaiming Reality*. London: Verso.
- Bhaskar, R. (1991). *Philosophy and the Idea of Freedom*. Oxford: Blackwell.
- Bhaskar, R. (1994). *Dialectic: The Pulse of Freedom*. London: Verso.
- Bhaskar, R. (1998). *The Possibility of Naturalism*. (3rd ed.). London: Routledge.
- Blake, K. (2011). A Woman in Games: A Personal Perspective, 1993 – 2010. *International Journal*.
- Blum, L. & Frieze, C. (2005). The evolving culture of computing: Similarity is the difference. *Frontiers: A Journal of Women Studies*, 26, 110-125
- Bowles, H., Babcock, L. & McGinn, K. (2005). *Constraints and Triggers: Situational Mechanics of Gender in Negotiation*, Working Paper Series rwp05-051, Harvard University, John F. Kennedy School of Government.
- Brand, J., Borchard, J. & Holmes, K. (2009). *IA9 Interactive Australia 2009*. The Centre for New Media Research Bond University: Australia Retrieved August 2009 Available at: http://works.bepress.com/jeff_brand/12 Downloaded http://epublications.bond.edu.au/cgi/viewcontent.cgi?article=1098&context=hss_pubs
- Brewer, M.B. & Gardner, W. (1996). Who is this, We?: Levels of collective identity & self representations. *Journal of Personality & Social Psychology*, 71, 83-93.
- Brown, A., Grollmann, P., Tutschner, R., & PARTICIPA Project Consortium (2004). Participation in Continuing Vocational Education and Training: Results from the Regional and Sectoral Surveys. *ITB-Arbeitspapiere Nr. 51*. Bremen: ITB, Universität Bremen.
- Brunner, C., Bennett, D., & Honey, M. (1998). Girl games and technological desire. In Cassell, J. & Jenkins, H. (1998). *From Barbie to Mortal Kombat*. Cambridge, MA: The MIT Press.
- Bruns, A. (2008). Blogs, Wikipedia, Second Life, and beyond: from production to produsage. *Digital Formations*, 45. Peter Lang, New York.
- Bryant, C & Jary, D. (1991). *Giddens' theory of structuration: a critical appreciation*. Bryant, C. & Jary, D. (Editors). Routledge, London; New York.
- Bryant, C. & Jary, D. (1997). *Anthony Giddens: critical assessments*, Routledge, (4 volumes).
- Buchanan, D. A. & Bryman, A. (2009). *The SAGE Handbook of Organizational Research Methods*. SAGE Publications Ltd.
- Bulkeley, D. (1995). Where to Recruit Your Next Rising Star, *Datamation*, 56-58.
- Bury, R. (2011). She's Geeky: The Performance of Identity among Women Working in IT. *International Journal of Gender, Science and Technology*, Vol.3, No.1.
- Bussey, K., & Bandura, A. (1999). Social cognitive theory of gender development and differentiation. *Psychology Review*, 106(4), 676-713.
- Calás, M.B. & Smircich, L. (2009). Feminist perspectives on Gender in Organisational Research: what is and is However to be. In Buchanan, D. & Bryman, A.(Eds.), *SAGE handbook of organisational research methods*. (246-269). SAGE, Great Britain: London.

- Calhoun, C., Gerteis, J., Moody, J., Pfaff, S. and Virk, I. (eds). (2002). *Contemporary Sociological Theory*. Oxford: Blackwell.
- Carlsson, S.A. (2006). Towards an Information Systems Design Research Framework: A Critical Realist Perspective, *Proceedings of the First International Conference on Design Science in Information Systems and Technology (DESIST 2006)*, 192-212.
- Cassell, J. & Jenkins, H. (Eds). (1998). *From Barbie to Mortal Kombat: Gender and Computer Games*, Cambridge, MA: The MIT Press.
- Castano, C. & Webster, J. (2011). Special Issue on Women in ICT: international research from a lifecourse perspective. *International Journal of Gender, Science and Technology*, 3(2).
- Castells, M. (1998). *The Information Age: Economy, Society and Culture. The Rise of Network Society*, (1). Oxford: Blackwell.
- Castells, M. (2001). *The Internet Galaxy: Reflections on the Internet, Business and Society*. Oxford: Oxford University Press.
- Cater-Steel, A., & Cater, E. (2010). *Women in Engineering, Science and Technology: Education and Career Challenges* (pp. 1-384). doi:10.4018/978-1-61520-657-5
- Cejka, M.A. & Eagly, A.H. (1999). Gender - stereotypic images of occupations correspond to the sex segregation of employment. *Personality and Social Psychology Bulletin*, 25, 413-42.
- Chase, S. E. (2008). Narrative Inquiry: Multiple Perspectives, Approaches, Voices, 57-94. In Denzin, N.K. & Lincoln, Y. S. (Eds). *Collecting and Interpreting Qualitative Materials* (3rd ed.). Thousand Oaks, CA: Sage.
- Christopherson, S. & van Jaarsveld, D. (2005). New Media after the Dot.com Bust. The Persistent Influence of Political Institutions on Work in Cultural Industries, *International Journal of Cultural Policy* 11(1): 77-93.
- Clegg, S.R. & Hardy, C. (1996). In Clegg, S.R. & Hardy, C. & Nord, W.R. (eds.). *Handbook of Organization Studies*. Sage, London, pp. 676-708.
- Clayton, K. L., von Hellens, L. A., & Nielsen, S. H. (2009). Gender stereotypes prevail in ICT: A research review, *SIGMIS-CPR '09*, May 28-30, Limerick, Ireland, 153-158.
- Cludts, S. (1999). Organisation Theory and the Ethics of Participation. *Journal of Business Ethics*, 23, 157-171. Retrieved from: <http://www.jstor.org/stable/25074164>
- Cochran, L. (1997). *Career counseling: A narrative approach*. Thousand Oaks, CA: Sage Publication
- McGrath- Cohoon, J. M. & Aspray, W. Editors. (2006). *Women and Information Technology: Research on Under-Representation*, MIT Press.
- Collet, I.(2006). *L'informatique a-t-elle un sexe?*, Paris, L'Harmattan, .European Commission Best practices for even gender distribution in the 25 Member States in the domain of ICT, Brussels, DG Information Society and Media.
- Collier, A. (1994). *Critical Realism: An Introduction to Roy Bhaskar's Philosophy*. London: Verso.
- Connell, R.W. (1987). *Gender and Power: Society, the Person and Sexual Politics*. Sydney: Allen and Unwin.
- Connell, R.W. (2002). *Gender*. Cambridge, Polity Press; Malden, Blackwell Publishers.
- Connell, R.W., & Dowsett, G.W. (1993). *Rethinking sex: Social theory and sexuality research*: Temple University Press.
- Connelly, J. (2001). Critical Realism and health promotion: effective practice needs an effective theory. *Health Education. Research*. 16, 115-120.
- Conrad, C.F. & Serlin, R.C. (Eds.). (2006). *The Sage Handbook for Research in Education: Engaging Ideas and Enriching Inquiry*. 303-314. Thousand Oaks, California: Sage.
- Consalvo, M. (2008). Crunched by passion: Women game developers and workplace challenges. In Y. B. Kafai, Y.B., Heeter, C., Denner, J. & Sun, J.Y. (Eds.), *Beyond Barbie and Mortal Kombat*. 177-192. Cambridge, MA: MIT Press.

- Cookson, P.S. (1986). A framework for theory and research on adult education participation, *Adult Education Quarterly*, 36(3), 130-141.
- Corden, A. & Sainsbury, R. (2006). *Using Verbatim Quotations in Reporting Qualitative Social Research: Researchers' views*, Social Policy Research Unit, University of York, York.
- Courtney, L., Lankshear, C., Anderson, N. & Timm, C. (2009). Insider Perspectives vs. Public Perceptions of ICT: toward policy for enhancing female student participation in academic pathways to professional careers in ICT. *Policy Futures in Education* 7(1). 2009.
- Craib, I. (1992). *Modern social theory: from Parsons to Habermas*. Hemel Hempstead: Harvester Wheatsheaf.
- Craig, A. (2004). *Redressing the Gender Imbalance in Australian Computing* - Position Papers for the Oxford Internet Institute (OII). Policy Forum Retrieved June 1 2005 from http://www.oii.ox.ac.uk/resources/publications/OIIPP_20040617-WomenInIT_200407.pdf
- Craig, A, Fisher, J., Forgasz, H. & Lang, C. (2011). Evaluation framework underpinning the digital divas programme, in unknown (ed.), ITiCSE 2011 : *Proceedings of the 16th Annual Conference on Innovation and Technology in Computer Science*, 313-317, Association for Computing Machinery, New York, N.Y.
- Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage.
- Creswell, J.W. (2003). *Research Design, Qualitative, Quantitative, and Mixed Methods Approaches* (2nd ed.). Thousand Oaks, CA: Sage.
- Creswell, J.W. (2007). *Qualitative Inquiry and Research Design: Choosing Among Five Traditions* (2nd ed.). Thousand Oaks, CA: Sage.
- Cunningham, S., Cutler, T., Ryan, M., Hearn, G. & Keane, M. (2003). Research and Innovation Systems in the Production of Digital Content and Applications. *Content and Applications, Creative Industries Cluster Study Volume III*. Commonwealth of Australia (DCITA). Canberra.
- Cutler & Company Pty Ltd. (1996). From marketplace to marketspace, *Australian Communications*, February.
- Dallimore, E. J. (2000). A Feminist Response to Issues of Validity in Research, *Women's Studies in Communications*, 23(2), 157-81.
- Danermark, B., Ekstrom, M., Jakobsen, L., Karlsson, J. (2002). *Explaining Society – Critical Realism in the Social Sciences*. London: Routledge
- Darke, P., Shanks, G. & Broadbent, M. (1998). Successfully completing case study research: combining rigour, relevance and pragmatism, *Information Systems Journal*, 8(4), 273-290.
- DCITA. (2005). *Australian Digital Content Industry Futures Plan*, Prepared for DCITA (Department of Communications, Information Technology and the Arts) by the Centre for International Economics, March 2005. September 19, 2006 from http://www.dcita.gov.au/__data/assets/pdf_file/37474/Appendix_C.2_Australian_digital_content_futures.pdf
- DCITA. (2006). *Unlocking the potential. Digital Content Industry Action Agenda*. Strategic Industry Leaders Group report to the Australian Government. Department of Communications, Information Technology and the Arts & Department of Industry, Tourism and Resources. Commonwealth of Australia, Canberra : Retrieved August 2007 http://www.dbcde.gov.au/__data/assets/pdf_file/0006/37356/06030055_REPORT.pdf
- Denzin, N. K., (1989a). *The research act* (3rd ed.). Englewood Cliffs, NJ: Prentice Hall.
- Denzin, N. K., (1989b). *Interpretive interactionism*. Newbury Park, CA, Sage.
- Denzin, N. K., (1989c). *Interpretive biography*. Newbury Park, CA: Sage
- Denzin, N. K., & Lincoln, Y. S (Eds.). (2003). *Landscape of Qualitative Research: Theories and Issues*, (2nd ed). London: Sage.
- Denzin, N. K., & Lincoln, Y. S (Eds.). (2008). *Strategies of qualitative inquiry*. Thousand Oaks, CA: Sage Publications.

- Dervin, B., (1997). Given a context by any other name: Methodological tools for taming the unruly beast. In Vakkari, P., Savolainen, R. & Dervin, B. (Eds.), *Information seeking in context* 13-38. London: Taylor Graham.
- Deuze, M., Martin, C., & Allen, C. (2007). The professional identity of gameworkers. *Convergence*, 13(4), 335–353.
- DiMaggio, P. (1991). The Micro-Macro Dilemma in Organizational Research: Implications of Role-System Theory. In Huber, J. (Ed.). *Macro-Micro Linkages in Sociology*. 76-98. Newbury Park, CA: Sage.
- Dobson, P.J., (1999). Approaches to Theory Use In Interpretive Case Studies – a Critical Realist Perspective. *Proc. 10th Australasian Conference on Information Systems*. Retrieved September 2nd, 2006, from <http://www.vuw.ac.nz/acis99/Papers/PaperDobson-075.pdf>
- Dobson, P.J. (2001a). Longitudinal Case Research: A Critical Realist Perspective. *Systemic Practice and Action Research*, 14(3), 2001 Plenum Publishing Corporation.
- Dobson, P.J. (2001b). The philosophy of Critical Realism - an opportunity for information systems research. *Information Systems Frontier*, 3(2), 199-201.
- Dobson, P.J. (2002). Critical Realism and IS research - Why bother with philosophy? *Information Research*. *Information research*, 7(2). Retrieved Sept 2007 <http://InformationR.net/ir/7-2/paper124.html>
- Dobson, P.J., Myles, J & Jackson, P., (2007). Making the Case for Critical Realism: Examining the Implementation of Automated Performance Management Systems, *Information Resources Management Journal*, 20(2). 140-152.
- Donovan, J. (2001). Work Motivation. In Anderson, N. & Sinangil, H.K. (Eds.), *Handbook of Industrial, Work and Organizational Psychology*, 53-76, Sage.
- Doolin, B. (1998). Information technology as disciplinary technology: Being critical in interpretive research on information systems [Special Issue on Interpretive Research in Information System]. *Journal of Information Technology*, 13(4), 301-312.
- DTI (Department of Trade and Industry). (2005). *Women in the IT Industry: Towards a Business Case for Diversity-Interim report*. United Kingdom. Retrieved August 2nd, 2006, from <http://www.dti.gov.uk/files/file9334.pdf>
- Duberley, J., Mallon, M., & Cohen, L. (2006). Exploring career transitions: accounting for structure and agency. *Personnel Review*, 35(3), 281-296. Retrieved from <http://www.emeraldinsight.com/10.1108/00483480610656694>
- Dubois, A. & Gadde, L-E. (2002). Systematic combining – an abductive approach to case research, *Journal of Business Research*, 55(7), 553–560.
- Easton G. (2000). Case research as a methodology for industrial networks: A Realist apologia, in *Realist Perspectives on Management and Organisations* in Fleetwood, S. & Ackroyd, S. (eds). Routledge, London and New York.
- Easton, G. (2001). Case research as a method for industrial networks. A Realist apologia, in *Realist Perspectives on Management and Organisations* in Fleetwood, S. & Ackroyd, S. (eds). Routledge, London and New York. Viewed online 2009 <http://books.google.com.au/>
- Easton, G. (2003). One Case Study is Enough. *Academy of Marketing Conference 2003*, Aston Business School.
- Easton, G. (2005). *Case study research: a Critical Realist approach*, Lancaster University Management School.
- Easton, G. (2009). Critical Realism in case study research, *Industrial Marketing Management* Retrieved: doi:10.1016/j.indmarman.2008.06.004
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532-550.
- Elliott, A.M. (2003). *Critical visions: new directions in social theory*, Lanham, USA: Rowman & Littlefield Publishers.

- Emirbayer, M. & A. Mische. (1998). What Is Agency? *American Journal of Sociology*. 103(4), 962–1023.
- Fairclough, N. (2005). Discourse Analysis in Organization Studies: The Case for Critical Realism, *Organization Studies*, 26(6).
- Fayolle, A. (2011). *Entrepreneurship and New Value Creation: The Dynamic of the Entrepreneurial Process*. ISBN. 9781107402904.
- Feyerband, P. (1999). *For and Against Method: Including Lakatos's Lectures on Scientific Method and the Lakatos-Feyerabend Correspondence with Imre Lakatos*, ISBN 0-226-46774-0, ISBN 0-226-46775-9
- Flew, T. & Cunningham, S.D. (2010). Creative Industries After the First Decade of Debate. *The Information Society*, 26(2). Retrieved 30 March 2010 <http://eprints.qut.edu.au/29852/2/29852.pdf>
- Flick, U. (2009). *An Introduction to Qualitative Research (4th edition)*. London, England: SAGE.
- Flores, F. & Gray, J. (2000). *Entrepreneurship and the Wired Life: Work in the Wake of Careers*, London: Demos
- Florida, R. (2002). *The Rise of the Creative Class*. BasicBooks, New York.
- Flyvbjerg, B. (2006). Five Misunderstandings about Case-Study Research. *Qualitative Inquiry*, 12(2), 219-245.
- Fontana, A. & Frey, J. H. (1994). Interviewing: The Art of Science. In Denzin, N.K. & Lincoln, Y. S. (Eds). *Handbook of Qualitative Research*. (2nd ed.). 361-376. Thousand Oaks, CA: Sage.
- Fox, S. (2009). Applying critical realism to information and communication technologies: A case study. *Construction Management and Economics*, 27(5), 465.
- Fullerton, T., Fron, J., Pearce, C. & Morie, J. (2008). Getting girls into the game: Towards a “Virtuous Cycle.” In Kafai, Y. Heeter, C. Denner, J. & Sun, J. (Eds.), *Beyond Barbie and Mortal Kombat: New perspectives on gender and gaming*. Cambridge, MA: MIT Press.
- Galliers, R. (1992). Choosing Information Systems Research Approaches. In Galliers, R. (Ed.), *Information Systems Research - Issues, Methods and Practical Guidelines*, 144-162. Alfred Waller Ltd.
- Gallivan, M. J. (2004). Examining IT Professionals’ Adaptation to Technological Change: The Influence of Gender and Personal Attributes. *The DATA BASE for Advances in Information Systems*. Summer 2004. Retrieved August 2nd, 2005, from ACM Portal from The ACM Digital Library Database.
- Gauntlett, D. (2001). The Worrying Influence of ‘Media Effects’ Studies, in Barker, M. & Petley, J. (eds), *Ill Effects: The Media/Violence Debate*, Routledge.
- Geertz, C. (1973). Thick description: Toward an interpretive theory of culture, in *The Interpretation of Cultures*. New York: Basic Books, 3-30.
- Geneve, A., (2011). *Five Acts of Agency* by women in the Australian Digital Content Industry. *Console-ing Passions conference*, 27-29 July, Adelaide, Australia 2011
- Geneve, A., and Ganito, C. (2011). Women and Technology: Five Acts of *Acts of Agency*. In Araya, D. Breindl, Y, Houghton, T (Ed.) *Nexus: New Intersections in Internet Research*. Peter Lang:USA ISBN 978-1-4331-0970-6 pb.
- Gerring, J. (2007). Is there a (viable). crucial-case method? *Comparative Political Studies* 40(3), 231-253.
- Gibbs, G.R., Friese, S. & Mangabeira, W.C. (2002). The Use of New Technology in Qualitative Research. Introduction to Issue 3(2). of FQS [35 paragraphs]. Forum Qualitative Sozialforschung / Forum: *Qualitative Social Research*, 3(2), Art. 8, <http://nbn-resolving.de/urn:nbn:de:0114-fqs020287>.Gibbs, G & Taylor, C. (2005). Coding with Atlas.ti v.5. Retrieved September 13, 2005 from http://onlineqda.hud.ac.uk/Step_by_step_software/Atlas.ti/Atlas.ti_coding.php
- Giddens, A. (1976). *New Rules of Sociological Method*, Basic Books, Hutchinson/New York.
- Giddens, A. (1979). *Central Problems in Social Theory: Action, Structure, and Contradiction in Social Analysis*. Berkeley: University of California Press.

- Giddens, A. (1984). *The Constitution of Society*. Polity Press, Cambridge.
- Giddens, A. (1988). Social Theory Today, in Giddens, A. & Turner, J. (Editors), *Social Theory Today*, Stanford University Press, Stanford.
- Giddens, A. (1991). *Modernity and self-identity*, Polity, Cambridge.
- Giddens, A. (1992). *The Transformation of Intimacy: Sexuality, Love and Eroticism in Modern Societies*, Cambridge: Polity Press
- Giddens, A. (1993). *New Rules of Sociological Method: A Positive Critique of Interpretive Sociologies*. New York: Basic Books.
- Giddens, A. (1997). *Sociology. 3rd Edition*. Cambridge: Polity Press
- Giddens, A., Duneier, M., Appelbaum, R.P. & Carr, D. (2008). *Essentials of Sociology. 2nd Edition*. New York: W.W. Norton & Company.
- Giddens, A. & Pierson, C. (1998). *Conversations with Anthony Giddens – Making Sense of Modernity*. Polity Press, Cambridge.
- Giddens, A. & Turner, J. (1988). *Social Theory Today*, Stanford University Press, Stanford.
- Gill, R. (2002). Cool, Creative and Egalitarian? Exploring Gender in Project-Based New Media Work in Europe. *Information, Communication and Society*, 5(1), 70-89.
- Gill, R. (2006). *Gender and the Media*. Cambridge: Polity Press.
- Gill, R. (2007). *Technobohemians or the new Cybertariat? Understanding contemporary new media work*. Institute of Network Cultures, Amsterdam.
- Gill, R. & Pratt, A. (2008). In the Social Factory? Immaterial Labour, Precariousness and Cultural Work. *Theory, Culture & Society*, 25(7-8), 1-30.
- Gill, R. (2010) "Life is a pitch": managing the self in new media work. In Mark Deuze (ed.) *Managing MediaWork*. London (etc) Sage.
- Gioia, D. & Pitre, E. (1990). Multiparadigm Perspectives on Theory Building, *Academy of Management Review* 15. 584–602.
- Glaser, B.G. (1992). *Emergence vs. Forcing: Basics of Grounded Theory*, Sociology Press, Mill Valley, CA.
- Gorski, P.S. (2008). The ECPRES Model: A Critical Realist Approach to Causal Mechanisms in the Social Sciences. in Wittrock, B. & Hedström, P. (Editors). *The Frontiers of Sociology*, 147-194. Leiden: Brill.
- Gourdin, A. (2005). Game developer demographics: an exploration of workforce diversity. *International Game Developers Association*, [online], http://www.igda.org/diversity/IGDA_DeveloperDemographics_Oct05.pdf, accessed 24 January 2008.
- Green, J. & Thorogood, N. (2009). *Qualitative methods for health research (2nd edition)*. Thousand Oaks, CA: Sage.
- Gregg, M. (2008). Testing the Friendship: Feminism and the Limits of Online Social Networks, *Feminist Media Studies*, 8(2): 197–223
- Gregg, M. and Seigworth, G.J.eds. (2010). *The Affect Theory Reader*. Duke University Press. 416 pp
- Gregor, S. (2002). A theory of theories in information systems. In Gregor, S. & Hart, D. (Eds.). *Information Systems Foundations: Building the Theoretical Base*. Australian National University, Canberra, 1-20.
- Gregor, S. (2006). The nature of theory in information systems. *Management Information Systems Quarterly*, 30(3), 611-642.
- Greig, A., Lewins, F. & White, K. (2003). *Inequality in Australia*. Cambridge: Cambridge University Press.

- Griffiths, M., Keogh, C., Moore, K., Richardson, H., & Tattersall, A. (2006). Inclusion through the ages? Gender, ICT workplaces and lifestyle experiences. In Kendall, J., Howcroft, D., et al. (Editors). *Social inclusion: societal and organisational implications for information systems*. Springer, New York, 153-168.
- Griffiths, M., & Moore, K. (2010). Disappearing Women: A Study of Women Who Left the UK ICT Sector? *Technology Management*, 5(1).
- Griffiths, M., Keogh, C., Moore, K., Tattersall, A. & Richardson, H. (2005). Managing Diversity or Valuing Diversity: Gender and the IT Labour Market. In Neiderman, F. & Ferratt, T. (Editors). *IT Workers: Human Capital Issues in a Knowledge-Based Environment*, Hershey, PA, USA: Information Science Publishing.
- Griffiths, M., Moore, K., & Richardson, H. (2007). Celebrating Heterogeneity: A survey of female ICT professionals in England. *Information, Communication & Society*, 10(3), 338-357.
- Griffiths, M., Moore, K., Burns, B., & Richardson, H. (2007). *The Disappearing Women: North West ICT Project Final Report*. Funded by the European Social Fund (ESF). Spring. Retrieved Feb 2010 http://usir.salford.ac.uk/9312/1/Griffiths_DW.pdf
- Grotz, B. (1999). Contexts of Collaboration. In Cognition, Agency and Rationality: *Proceedings of the Fifth International Colloquium on Cognitive Science*, Kepa Korta, Sosa, E. & Arrazola, X. (Eds.), Philosophical Studies Series 79, Dordrecht/Boston: Kluwer Academic Press.
- Gruys, M., Munshi, N., & Dewett, T. (2011). When antecedents diverge: Exploring novelty and value as dimensions of creativity, *Thinking Skills and Creativity*, In Press, Corrected Proof available online 5 February 2011, ISSN 1871-1871, DOI: 10.1016/j.tsc.2011.01.005. (<http://www.sciencedirect.com/science/article/pii/S1871187111000174>).
- Guba, E. G. & Lincoln, Y. S. (1989). *Fourth generation evaluation*. Newbury Park, CA: Sage.
- Guba, E. G. & Lincoln, Y. S. (2005). Paradigmatic controversies, contradictions and emerging confluences. In Denzin, N. & Lincoln, Y. S. (Eds.). *The Sage Handbook of Qualitative Research*, 8, 191-215, Sage Publications.
- Gurer, D. & Camp, T. (2002). Investigating the incredible shrinking pipeline for women in computer science (Final report). *National Science Foundation Project 9812016*. Retrieved on 6 May 2006 from www.acm.org/women/pipeline-finalreport_ver_2.doc
- Haukka, S (2009). From education to work in Australia's creative digital industries: the opinions and practices of aspiring creatives in the creative industries, 60Sox report vol. 1, QUT, Brisbane, viewed 19 May 2013, <http://eprints.qut.edu.au/29795/1/60Sox_Survey_Report_Volume_June_2009.pdf> Accessed 19 June 2011
- Haukka, S, and Brow,B. (2010). *From education to work in Australia's Creative Digital Industries: Comparing the opinions and practices of employers and aspiring creatives* (60Sox Report Volume 2, January 2010), available at <http://www.apo.org.au/research/education-work-australias-creative-digital-industries..> Accessed 19 June 2011.
- Haines, L. (2004). Why are there so few women in games? *Research for Media Training North West*.
- Halford, S., Savage M. & Witz, A. (1997). *Gender, careers and organizations. Current developments in banking, nursing and local government*, Macmillan.
- Hammersley, M. (1995). Theory and evidence in qualitative research. *Quality and Quantity*, 29(1). 55-66.
- Hammersley, M. (2009). Why critical realism fails to justify critical social research. *Methodological Innovations Online*, 4(2). 1-11.
- Hammersley, M. & Atkinson, P. (1983). *Ethnography: Principles in practice*, Tavistock: London.
- Hammersley, M. & Atkinson, P. (1995). *Ethnography: Principles in practice*, 2nd Ed. Routledge, London and New York.
- Hammersley, M. & Gomm, R. (2000). Introduction. In Gomm, R. Hammersley, M. & Foster, P. (Editors). *Case study method*. London: Sage. 1-16.
- Harding, S. (2004). *The Feminist Standpoint Theory Reader: Intellectual and Political Controversies*, Routledge, New York, NY,

- Harrison, D. & Easton, G. (2004). Temporally embedded case comparison in industrial marketing research. In *Critical Realist Applications in Organisation and Management Studies*, Fleetwood, S., Ackroyd, S. (Editors). Routledge: London, U.K. 194–210.
- Hatch, M.J. (1997). *Organization Theory: Modern Symbolic and Postmodern Perspectives*. Oxford: Oxford University Press.
- Hayes, E. (2008). Girls, gaming, and trajectories of technological expertise, in Kafai, Y.B., Heeter, C., Denner, J., & Sun, J. (eds.). *Beyond Barbie and Mortal Kombat: New Perspectives on Gender, Games, and Computing*, Boston, MIT Press.
- Healy, K. (1998). Conceptualising Constraint: Mouzelis, Archer and the Concept of Social Structure. *Sociology*, 32(3), 509-522.
- Healy, M. & Perry, C. (2000). Comprehensive criteria to judge validity and reliability of qualitative research within the realism paradigm. *Qualitative Market Research*, 3(3), 118-126. Retrieved December 6, 2009, from ABI/INFORM Global.
- Heeter, C., Egidio, R., Mishra, P., Winn, P. & Winn, J. (2009). Alien Games: Do Girls Prefer Games Designed by Girls? *Games and Culture*, 4(1), 74-100.
- Heidegger, M. (1962). *Being and Time*, Basil Blackwell: Oxford.
- Higgs, P. & Cunningham, S. (2008), Creative Industries Mapping: Where have we come from and where are we going?, *Creative Industries Journal*, 1(1), 7–30.
- Hitlin, S. & Elder, Jr. G.H. 2007. Agency: An Empirical Model of an Abstract Concept. In *Advances in Life Course Research*, 11, edited by Macmillan, R. Netherlands: Elsevier/JAI Press. 33–67
- Hodgson, G. (2004). Some claims made for critical realism in economics: two case studies, *Journal of Economic Methodology*, Taylor & Francis Journals, 11(1), 53-73.
- Hofstede, G. (1993). Cultural Constraints in Management Theories, *Academy of Management Executive*, February.
- Hogg, M. A., & Terry, D. J. (Eds.). (2001) Social identity processes in organizational contexts. Philadelphia: Psychology Press.
- Holland, D. & Lave, J. (Eds.) (2001). *History in Persons: Enduring struggles, contentious practice, intimate identities*. Sante Fe, NM:School of American Research, Oxford.
- Holstein, J.A., & Gubrium, J. F. (1995). The Active Interview. *Qualitative Research Methods*, 37. London: Sage Publications.
- Hoonakker, P.L.T., Carayon, P. & Schoepke, J. (2006). Discrimination and Hostility Toward Women and Minorities in the IT Workforce. In *Encyclopaedia of Gender and Information Technology* (E. Trauth, editor). Hersey, PA: Idea Group Inc, 207-215.
- Houghton, J. (2001). *Impact of the ICT industry in Australia*. Report for Australian Computer Society. Retrieved Sept 17 2007 from <http://www.acs.org.au/notices/itcimpact.pdf>
- Howcroft, D., & Trauth, E.M. (2005). *Handbook of Critical Information Systems Research: Theory and Application*, Edward Elgar, Cheltenham,
- Howcroft, D., & Trauth, E.M. (2008). The Implications of a Critical Agenda in Gender and IS Research, *Information Systems Journal Special Issue: Exploring the Critical Agenda in IS Research*. 18(2): 185-202.
- Huff, C. (2002). Gender, software design, and occupational equity. Women and Computing [Special issue]. *ACM SIGCSE Bulletin*, 34(2), 112 – 115.
- Huntemann, N. (2007). *Pink Slips for Booth Babes?: No Way! Re-train and Re-skill! Special Issue: Video Games*, Featured Articles, Volume 5. Retrieved 30th Aug 2010 from <http://flowtv.org/2007/02/pink-slips-for-booth-babes-no-way-re-train-and-re-skill/>
- Hyde, J. S. (1990). Meta-Analysis and the Psychology of Gender Differences. *Signs*, 16(1), 55-73.
- IBSA (2011), Environment Scan. Information and Communications Technology Industries. Department of Education, Employment and Workplace Relations (DEEWR). Australian Government

- IGDA (2005a). *Game Developer Demographics: An Exploration of Workforce Diversity Comments on Diversity*. Downloaded http://archives.igda.org/diversity/IGDA_DeveloperDemographics_Oct05.pdf
- IGDA (2005b). *Game Developer Demographics: An Exploration of Workforce Diversity supplemental resource of raw data*. http://www.igda.org/sites/default/files/IGDA_Comments-on-Diversity_Jul05.pdf
- Ilie, V., Van Slyke, C., Green, G. & Lou, H. (2005). Gender Differences in Perceptions and Use of Communication Technologies: A Diffusion of Innovation Approach, *Information Resource Management Journal*, 18(3), 16-31.
- Information Technology Association of America (ITAA). (2005). Untapped talent: Diversity, competition, and America's high tech future—executive summary. Retrieved from <http://www.itaa.org/eweb/upload/execsummdr05.pdf>
- Ivory, J. (2006). Still a Man's Game: Gender Representation in Online Reviews of Video Games. *Mass Communication & Society*, 9(1), 103-114.
- James, W. (1907). *Pragmatism: A New Name for Some Old Ways of Thinking*. New York, 52-61.
- Jansz, J. (2005). The emotional appeal of violent video games for adolescent males. *Communication Theory*, 15(3), 219-241.
- Jansz, J., & Martis, R. (2003). The representation of gender and ethnicity in digital interactive games. In Copier, M. & Raessens, J. (Eds.), *Level Up: Digital Games Research Conference* 260-269. Utrecht: Utrecht University.
- Jenkins, H. & Cassell, J. (2008). From Quake Grrls to Desperate Housewives: A Decade of Gender and Computer Games. In Kafai, Y., Heeter, C., Denner, J. & Sun, J. (eds.). *Beyond Barbie and Mortal Kombat: New Perspectives on Gender and Gaming*. Cambridge, MA: MIT Press. Retrieved http://www.soc.northwestern.edu/justine/publications/Jenkins_Cassell%20BBMK_Forward.pdf
- Jeppson, S. (2005). Critical Realism as a Approach to Unfolding Empirical Findings: Thoughts on Fieldwork in South Africa on SMEs and Environment. *The Journal of Transdisciplinary Environmental Studies*, 4(1).
- Jeppson, A. & Perl, T. (2002). Priming the pipeline. *Inroads SIGCSE Bulletin*, 34(2), 36-39.
- Joas, H. (1993). *Pragmatism and Social Theory*, Chicago, University of Chicago Press.
- Joas, H. (1997). *The Creativity of Action*, Chicago, University of Chicago Press.
- Johnson, R. B. & Onwuegbuzie, A.J. (2004). Mixed Methods Research: A Research Paradigm Whose Time Has Come. *Educational Researcher*, 33(7), 14-26.
- Jones, M.R. (1999). Structuration theory. In Currie, W.J. & Galliers, R.D. (Eds.). *Re-thinking Management Information Systems*, 103-135. Oxford: Oxford University Press.
- Jones, M. & Karsten, H. (2003). 'Review: Structuration theory and information systems research'. WP 11/03. *Judge Institute Working Papers*. Cambridge: University of Cambridge.
- Joshi, K.D. & Kuhn, K. (2005). Examining the masculinity and femininity of critical attributes necessary to succeed in IT. *Proceedings of the 2005 ACM SIGMIS CPR conference on Computer Personnel Research*, April 14-16, 2005, Atlanta, Georgia, USA (pp. 32-35). New York, NY, USA : ACM Press. Retrieved August 2nd, 2005, from ACM Portal from The ACM Digital Library Database.
- Joshi, K.D., Kvasny, L., McPherson, S., Trauth, E., Kulturel-Konak, S. & Mahar, J. (2010). Choosing IT as a career: exploring the role of self-efficacy and perceived importance of IT skills, *ICIS 2010 Proceedings*. Paper 154. http://aisel.aisnet.org/icis2010_submissions/154
- Kanter, R. (1977) *Men and women of the corporation*. New York: Basic Books.
- Kappos, A. & Rivard, S. (2008). A Three-Perspective Model of Culture, Information Systems, and Their Development and Use, *MIS Quarterly*, 32(3); 601-634.
- Kelle, U. (1995) *Capabilities for "Theory Building" and "Hypothesis Testing" in Software for Computer-aided Qualitative Data Analysis*. Retrieved September 13, 2005 from <http://caqdas.soc.surrey.ac.uk/kellecapabilities.pdf>
- Kerr, A. (2006). *The Business and Culture of Digital Games, Game work and Game Play*. Sage, London.

- Kincheloe, J. L. (2001). Describing the Bricolage: Conceptualizing a New Rigor in Qualitative Research. *Qualitative Inquiry*, 7(6), 679-692.
- Klawe, M., (2002) Girls, boys, and computers. *SIGCSE Bulletin*, 34(2), 16-17
- Klein, H. K. & Myers, M.D. (1999). A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems, *MIS Quarterly, Special Issue on Intensive Research*. 23(1), 67-93.
- Klein, K. J., Cannella, A. & Tosi, H. (1999). Multilevel theory: Challenges and contributions. *Academy of Management Review*, 24, 243-248.
- Koesten, J., Miller, K.I. & Hummert, M.L. (2002). Family communication, self-efficacy and white adolescent females' risk behavior. *Journal of Family Communication*, 1; 7-27.
- Krotoski, A. (2004). Chicks and joysticks: An exploration of women and gaming. White paper Entertainment and Leisure Software Publishers Association (ELSPA)
- Kvasny, L. Joshi, K.D. & Trauth, E.M. (2011). The Influence of Self-Efficacy, Gender Stereotypes and the Importance of IT Skills on College Students' Intentions to Pursue IT Careers, *Proceedings of the 2011 iConference* (Seattle, WA).
- Kvasny L. & Trauth, E. (2002). The Digital Divide at Work and at Home: Discourses about Power and Underrepresented Groups in the Information Society. In Whitley, E. Wynn, E. & DeGross, J. (Eds.), *Global and Organizational Discourse About Information Technology*, NewYork: Kluwer Academic Publishers. 273-294.
- Kvasny, L., Trauth, E.M. & Morgan, A. (2009). Power Relations in IT Education and Work: The Intersectionality of Gender, Race and Class, *Journal of Information, Communication and Ethics in Society Special Issue on ICTs and Social Inclusion*. 7(2/3), 96-118.
- Lakatos, I. (1978). *The Methodology of Scientific Research Programmes*, ed. J. Worrall & G. Currie. Cambridge: Cambridge.
- Lang, C. (2003). Gender and the geek factor: Why don't women do IT? *Traffic*, 3, 79-91.
- Lang, C. (2007a). Twenty-first Century Australian Women and IT: Exercising the power of choice, *Computer Science Education*, 17(3), 215-226. Retrieved April 20, 2008, from <http://www.informaworld.com.ezp02.library.qut.edu.au/10.1080/08993400701538120>
- Lang, C. (2007b). *Factors that shape student decision-making related to information technology study and career choices: a gendered analysis*. PhD Thesis.
- Lang, C., Craig, A., Fisher, J., & Forgasz, H. (2010). Creating Digital Divas – Scaffolding Perception Change Through Secondary School and University Alliances. *Computer*, 38-42.
- Lanzalotto, J. (2007). How to narrow IT's gender gap. Winning the hearts and minds of the industry's top female talent could be easy. In *Computerworld*. Retrieved 30th August 2010 from http://www.computerworld.com.au/article/61206/how_narrow_it_gender_gap/#closeme
- Lave, J. & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press.first published in 1990 as Institute for Research on Learning report 90-0013.
- Lawson, T. (1997). *Economics and Reality*. London: Routledge.
- Layder, D. (1993). *New Strategies in Social Research*. Polity Press, Cambridge, UK.
- Layder, D. (1998). *Sociological practice: linking theory and social research*. Sage, London.
- Layder, D. (2006). *Understanding social theory*, Sage.
- Lee, A.S. & Baskerville, R. L. (2003). Generalizing Generalizability in Information Systems Research. *Information Systems Research*, 14(3), 221–243.
- Leedy, P. D., & Ormrod, J. E. (2005). *Practical research: Planning and design*. Upper Saddle River, NJ: Prentice-Hall.
- Lent, R.W., Brown, S.D., & Hackett, G. (1994). Monograph: Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behaviour*, 45, 79-122.

- Lent, R.W., Brown, S.D., & Hackett, G. (1996). Career development from a social cognitive perspective. In Brown, D. & L. Brooks (Eds.), *Career choice and development*. San Francisco, CA: Jossey-Bass Inc. 373-421.
- Lent, R.W., Brown, S.D., Schmidt, J., Brenner, B., Lyons, H. & Treistman. (2003). Relation of contextual supports and barrier, Ds to choice behavior in engineering majors: Test of alternative social cognitive models. *Journal of Counseling Psychology* 50(4), 458–65.
- Levy, Y. & Ellis, T.J. (2006). A Systems Approach to Conduct an Effective Literature Review in Support of Information Systems Research. *Science Journal*, 9.
- Lewis, M.W. & Grimes, A.J. (1999). Metatriangulation: Building Theory from Multiple Paradigms, *Academy of Management Review*, 24(4), 672-690.
- Lewis, P. & Simpson, R. (2007). *Gendering Emotions in Organizations*. Basingstoke: Palgrave.
- Lincoln, Y.S., & Guba, (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage.
- Lincoln, Y.S., & Guba, (2000). Paradigmatic controversies, contradictions, and emerging confluences. In Denzin, N.K. & Lincoln, Y.S. (Eds.), *Handbook of qualitative research* (2nd edition), 163-188. ThousandOaks, CA: Sage.
- Lippa, R. (2002). *Gender, Nature, and Nurture*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Lind, M., & Goldkuhl, G. (2006). How to develop a multi-grounded theory: The evolution of a business process theory. *Australasian Journal of Information Systems*, 13 (2), 1-10.
- Llewelyn, S. (2003). What counts as "Theory" in qualitative management and accounting research? Introducing five levels of theorising. *Accounting, Auditing & Accountability Journal*, 16(4); 662-708.
- Lloyd, M. (2009). Geek goddesses go to school: A study of female preservice teachers in information technology courses. In *BERA 2009 Annual Conference*, September 2-5, University of Manchester, Manchester.
- Lofland, J. & Lofland, L. (1995). *Analyzing social settings*, 3rd Edition. Belmont, Cal: Wadsworth.
- López, J. & Potter, G. (Eds) (2001). *After Postmodernism: An Introduction to Critical Realism*. Athlone, London.
- Luck, L., Jackson, D. & Usher, K. (2006). Case study: a bridge across the paradigms. *Nursing Inquiry*, 13, 103–109.
- Macknight, J. (2001). Nerdy image and blokish behaviour drive women away from IT. *Computer Weekly*, March 8.
- Mackrell, D. & Nielsen, S. (2007). Structuration Theory in Information Systems Research: Relevance and Rigour from a Pluralist Research Approach. *Proceedings of the 18th Australasian Conference on Information Systems*, University of Southern Queensland, Queensland, December
- Major, D.A., Davis, D.D., Sanchez-Hucles, J.V., Germano, L.M. & Mann, J. (2006). IT Workplace Climate for Opportunity and Inclusion. In Trauth, E.M. (Ed.), *Encyclopedia of Gender and Information Technology*, 856-862.
- Margolis, J. & Fisher, A. (2002). *Unlocking the Clubhouse*. Cambridge, MA: MIT.
- Martin, C. & Deuze, M. (2009). The Independent Production of Culture: A Digital Games Case Study. *Games and Culture*, 4(3), 276-295.
- Maslow, A.H. (1962). Notes on Being-Psychology Journal. *Humanistic Psychology*, 2,47-71.
- Mathews, M. (2008). Science and Innovation Policy and the New (and Old). Economics of Creativity, Vol, 1 (1). *Cultural Science*. ISSN 1836-0416. Retrieved 19th August 2009 online <http://cultural-science.org/journal/index.php/culturalscience/article/view/9>
- May C.R, Mair F, Finch T, Macfarlane A, Dowrick C, Treweek S, Rapley T, Ballini L, Ong B.N, Rogers A, Murray E, Elwyn G, Légaré F, Gunn J, Montori V.M. (2009) Development of a theory of implementation and integration: normalization process theory. *Implement Sci.* (4) 29.
- Maxwell, J. A. (1992). Understanding and validity in qualitative research. *Harvard Educational Review*, 62(3), 279-300.

- Maxwell, J.A. (2005). *Qualitative research design: An interactive approach* (2nd ed). Thousand Oaks, CA: SAGE Publications.
- McGrath, J., & Kelly, J. (1986). *Time and human interaction: towards a social psychology of time*, New York: Guildford Press.
- McGrath-Coochan, J.M. & Aspray, W. (Eds). (2006). *Women in Information Technology: Research on Under-representation*. Cambridge, MA: MIT Press.
- McLennan, G. (1989). *Marxism, Pluralism and Beyond, Polity*, 165-197.
- Melymuka, K. (2000). Glass ceilings & clear solutions. *Computerworld*. 34(22). 53.
- Merriam, S.B. (1998). *Qualitative research and case study applications in education*. San Francisco: Jossey-Bass.
- Merton, R. (1967). *On Theoretical Sociology*. Free Press, New York.
- Meyerson, D.E., & Fletcher, J.K. (2000). A modest manifesto for shattering the glass ceiling. *Harvard Business Review*, 78(1), 126-136.
- Miles, M.B., & Huberman, A.M. (1994). *Qualitative data analysis: an expanded sourcebook* (2nd ed.). Thousand Oaks, CA: Sage Publications, Ltd.
- Mills, A., Durepos, G. & Wiebe, E. (2009). Naturalistic generalization. *Encyclopedia of Case Study Research*. Edited by Mills, A.J., Durepos, G. & Wiebe, E. Thousand Oaks, CA: Sage Publications.
- Mills, C.W. (1959). *The Sociological Imagination*, Oxford University Press, London.
- Mingers, J. (1997). Combining research methods in information systems: multiparadigm methodology, *Proceedings of the Fifth European Conference on Information Systems, Cork, Ireland*, 19-21 June, 760-776.
- Mingers, J. (2000). The contribution of Critical Realism as an underpinning philosophy for OR/MS and systems, *Journal of the Operational Research Society*, 51(11), 1256-1270.
- Mingers, J. (2001). Combining IS research methods: Towards a pluralist methodology. *Information Systems Research*, 12(3), 240-259.
- Mingers, J. (2002). Realizing information systems: Critical realism as an underpinning philosophy for information systems, in *International Conference on Information Systems*, (ed, DeGross, J). Association of Information Systems, Barcelona, 295-303.
- Mingers, J. (2003). The paucity of multimethod research: review of the IS literature. *Information Systems Journal*, 13(3), 233-249.
- Mingers, J. (2004). Realizing information systems: Critical Realism as an underpinning philosophy for information systems. *Information and Organization*, 14(2), 87-103.
- Mingers, J. (2006). *Realising Systems Thinking: Knowledge and Action in Management Science*. New York: Springer.
- Mir, R. & Mir, A. (2002). The Organizational Imagination: From Paradigm Wars to Praxis, *Organizational Research Methods*, 5, 105-125.
- Montano, S. & Szmigin, I. (2004). Case study research: A Critical Realist approach. (Eds). Brown, A & Remenyi, D. *Proceedings of the 4th European Conference on Research Methods: In Business and Management Studies*. Universite Paris Duaphine, Paris.
- Moore, A. K., Griffiths, M., & Richardson, H. (2005a). Moving in, Moving up, Moving out? A Survey of Women in ICT. *Information Systems*, 1-28.
- Moore, A. K., Griffiths, M., & Richardson, H. (2005b). Gender on the Agenda: flexible working and work-life balance in the UK ICT industry, *6th International Women in Computing (WIC). Conference* 14-15 July 2005, University of Greenwich London UK.
- Morgan, A.J., Quesenberry, J.L. & Trauth, E.M. (2004). Exploring the Importance of Social Networks in the IT Workforce: Experiences with the 'Boy's Club.' *Proceedings of the Americas Conference on Information Systems* (New York, August).

- Morgan, G. & Smircich, L. (1980). The case for qualitative research. *Academy of Management Review*, 5(4), 491-500.
- Morse, J.M. (1994). Designing funded qualitative research. In Denzin, N.K. & Lincoln, Y.S. (Eds.), *Handbook of qualitative research*, 220-233. Thousand Oaks, CA: Sage.
- Morse, J. & Richards, L. (2002). *Read me first for a user's guide to qualitative methods*. London, Sage Publications.
- Mouzelis, N. (1995). *Sociological Theory: What Went Wrong?* New York: Routledge.
- Mutch, A. (1997). Critical Realism and information systems: an exploration. *The 7th Annual BIT Conference*, Manchester.
- Mutch, A. (2007). Reflexivity and the Institutional Entrepreneur: A Historical Exploration. *Organization Studies*, 28, 1123-1140.
- Myers, M.D. (1994). Dialectical Hermeneutics: a Theoretical Framework for the Implementation of Information Systems, *Information Systems Journal*, 5, 51-70.
- Myers, M.D. (1997). Interpretive research in information systems. In Mingers, J. & Stowell, F.A. (Eds.), *Information systems: An emerging discipline?* London: McGraw-Hill. 239-266.
- Myers, M.D. & Newman, M. (2007). The qualitative interview in IS research: Examining the craft, *Information and Organization*, 17(1), 2-26.
- Negroponte, N. (1999). *Being Digital*. New York: Knopf.
- Nielsen Online Consumer report (2010) *The Australian Online Consumer Report*. Retrieved March 2011 http://www.ad-tech.com/sydney_uploads/nielsen_WhitePaper2011.pdf
- Neuman, W. L. (1997). *Social research methods: Qualitative and quantitative approaches*. Boston: Allyn and Bacon.
- Neuman, W. (2000). *Social Research Methods: Qualitative and quantitative approaches*. Needham Heights: Allyn & Bacon.
- Newmarch, E., Taylor-Steele, S. & Cumpston, A. (2000). Women in IT- What are the Barriers. *Network of Women in Further Education Conference "Net Gains: Women, Information Technology and Emerging Issues"*, March 22. Department of Education, Science and Training. Australia.
- Olsen, W. (2008). Realist ontology and epistemology for rural research, September 2008 BWPI Working Paper 53. *World*, (September), 1-26.
- Onwuegbuzie, A.J. & Leech, N.L. (2005a). The role of sampling in qualitative research. *Academic Exchange Quarterly*, 9(3), 280-284.
- Onwuegbuzie, A. J., & Leech, N. L. (2005b). A Typology of Errors and Myths Perpetuated in Educational Research Textbooks, *Current Issues in Education [On-line]*, 8(7). Available: <http://cie.ed.asu.edu/volume8/number7/>
- Onwuegbuzie, A. J. & Leech, N. L. (2007). Sampling designs in qualitative research: Making the sampling process more public. *The Qualitative Report*, 12(2), 238-254.
- Orlikowski, W.J. & Baroudi, J.J. (1991). Studying Information Technology in Organizations: Research Approaches and Assumptions, *Information Systems Research* (2), 1-28.
- Orlikowski, W.J. & Robey, D. (1991). Information Technology and the Structuring of Organizations. *Information Systems Research*, 2 (2), 143-169.
- Oswald, D. L. (2008). Gender stereotypes and women's reports of liking and ability in traditionally masculine and feminine occupations. *Psychology of Women Quarterly*, 32, 196-203. Retrieved May 22nd 2008, <http://www.ingentaconnect.com/content/bpl/pwqu/2008/00000032/00000002/art00008>
- Panteli, N., Stack, J., Atkinson, M. & Ramsay, H. (1999). The status of women in the UK IT industry: an empirical study, *European Journal of Information System*, 8, 170-82.
- Panteli, N. (2005). Women, Work & IT: Reproducing gender inequality: Segregation and career paths in information technology jobs in Australia. *Proceedings of the Women Work and IT conference: Contemporary perspectives on the reproduction of gender inequality in employment*, June 23-24,

- 2005, Brisbane, Australia. School of Political Science and International Studies: University of Queensland.
- Parberry, I., Kazemzadeh, M. & Roden, T. (2006). The art and science of game programming, *Proceedings of the 37th SIGCSE technical symposium on Computer science education*, March 03-05, 2006, Houston, Texas, USA.
- Parker, J. (2000). *Structuration*, Buckingham, Open University Press.
- Patton, M. (2002). *Qualitative research and evaluation methods* (3rd ed.). London: Sage.
- Patton, M.Q. (1990). *Qualitative Evaluation and Research Methods*, Newbury Park, Sage Publications.
- Patton, W., Bartrum, D.A. & Creed, P.A. (2004). Gender differences for optimism, self esteem, expectations and goals in predicting career planning and exploration in adolescents. *International Journal for Educational and Vocational Guidance*, 4(2-3), 193-209.
- Pawson, R., Greenhalgh, T., Harvey, G. & Walshe, K. (2004). *Realist synthesis: an introduction*. Manchester: University of Manchester, Faculty of Social Sciences. (ESRC Research Methods Programme Paper 2/2004). Retrieved 28 December, 2010 from <http://www.ccsr.ac.uk/methods/publications/RMPmethods2.pdf> (Archived by WebCite® at <http://www.webcitation.org/5vJiVkJ8A>).
- Pearl, A., Pollack, M.E., Riskin, E., Thomas, B., Wolf, E. & Wu, A. (1990). Becoming a computer scientist: A report by the ACM Committee on the status of women in computing science. *Communications of the ACM*, 33(11), 47-57.
- Pease, A. & Pease, B. (1998). *Why men don't listen and women can't read maps: How we're different and what to do about it*. New York: Broadway Books
- Peirce, C.S. (1955). Abduction and induction. In Justus Buchler (Ed.), *Philosophical writing of Peirce*. New York: Dover Publications. 150-156.
- Perrons, D. (2003a). The new economy and the work-life balance: conceptual explorations and a case study of new media. *Gender, work & organisation*, 10(1), 65-93.
- Perrons, D. (2003b). The new economy, labour market inequalities and the work life balance. In: Martin, R. & Morrison, P.S. (eds.). *Geographies of labour market inequality*. Routledge, London, 129-148.
- Perrons, D. (2005). Gender mainstreaming and gender equality in the new (market) economy: An analysis of contradictions. *Social politics: international studies in gender, state & society*, 12 (3), 389-411.
- Perrons, D. (2007). Living and working patterns in the new knowledge economy: new opportunities and old social divisions in the case of new media and care-work. In Walby, S., Gottfried, H., Gottschall, K. & Osawa, M. (Eds.). *Gendering the knowledge economy: comparative perspectives*. Palgrave Macmillan, Basingstoke, UK, 188-206.
- Perrons, D., McDowell, L., Fagan, C., Ray, K. & Ward, K. (2007). Gender, social class & work-life balance in the new economy. In Crompton, R., Lewis, S. & Lyonette, C. (Eds.). *Women, men, work and family in Europe*. Palgrave Macmillan, Basingstoke, UK, 133-151.
- Perry, C. (1998). Processes of a case study methodology for postgraduate research in marketing, *European Journal of Marketing*, 32 (9/10), 785-802.
- Pham, A. (2008, October 21). Women left on sidelines in video game revolution, *Los Angeles Times*, retrieved 20 August 2009.
- Pini, M. (2001). *Club Cultures and Female Subjectivity: The Move from Home to House*, London: Palgrave.
- Pocock, B. (1998). All Change, Still Gendered : the Australian Labour Market in the 1990s, *Journal of Industrial Relations*, 40, 580-604.
- Poole, M.S. & Van de Ven, A.H. (1989). Using paradox to build management and organization theories. *Academy of Management Review*, 14, 562-578.
- Pozzebon, M. & Pinsonneault, A. (2005). Challenges in Conducting Empirical Work Using Structuration Theory: Learning from IT Research, *Organization Studies*, 26 (9), 1353 - 1376.

- Prasad, A. (2002). The Contest over meaning: Hermeneutics as an Interpretive Methodology for Understanding Texts, *Organizational Research Methods*, 5, 12-33.
- Pratt, A.C. (2000). New Media, the New Economy and New Spaces', *Geoforum*, 31(4), 425–36.
- Pratt, A.C. (2006). Advertising and Creativity, a Governance Approach: A Case Study of Creative Agencies in London, *Environment and Planning*, 38(10), 1883–99.
- Pratt, M. (2007). Computer game industry looks to women for fresh insights. Retrieved 18 Sept 2010 from http://www.computerworld.com/s/article/293317/Computer_game_industry_looks_to_women_for_fresh_insights
- Pratt, A.C., Gill, R. & Spelthann, V. (2007). Work and the city in the E-society A critical investigation of the sociospatially situated character of economic production in the digital content industries in the UK, *Information, Communication & Society*, 10(6), 922-942.
- Prescott, J. & Bogg, J. (2010). The Computer Games Industry: Women's Experiences of Work Role in a Male Dominated Environment. In Cater-Steel, A. & Cater, E. (Eds.), *Women in Engineering, Science and Technology: Education and Career Challenges*, 138-158.
- Prescott, J., & Bogg. (2011). Segregation in a Male-Dominated Industry: Women Working in the Computer Games Industry. *International Journal of Gender, Science and Technology*, Vol.3, No.1.
- Puth, G. (1996). *Dynamics of the Marketing Environment: Implications for Marketing Training in South Africa*. Unpublished monograph. Department of Business Economics, University of Pretoria
- Queensland Government. (2001). *Beyond the Pink Collar: Towards Strategies to Respond to Women and Work Issues in Queensland*. Premiers Council for Women Brisbane, Australia: Queensland Government.
- Queensland Government. (2003). *Women in the Smart State Directions Statement 2003–2008*. Brisbane, Australia: Queensland State Government. Retrieved October 19, 2006 from <http://www.communities.qld.gov.au/resources/women/resources/directions-statement/directions-statement-text.pdf>
- Queensland Government. (2006a). *Issues paper from the National ICT skills summit, June 21 & 22*, Brisbane, Australia: Queensland State Government. Retrieved 10Oct 2010 from <http://203.210.126.185/dsdweb/v4/apps/web/secure/docs/2406.pdf>
- Queensland Government. (2006b). *Smart Women – Smart State Taskforce Women's Participation in Emerging Industries: Science, Engineering and Technology Concept Paper*. June 2006. Supporting Women's Participation in Emerging Industries: Science, Engineering and Technology, Brisbane, Australia: Queensland State Government, Retrieved Oct, 2011 from <http://www.communities.qld.gov.au/resources/women/work-and-life/set-concept-paper.pdf>
- Queensland Government. (June 2006c). *Smart Women – Smart State Strategy Science, Engineering and Technology Action Plan 2006 – 2009*. Queensland Government Office for Women. Brisbane, Australia: Queensland Government. Retrieved June 2007 from <http://www.communities.qld.gov.au/resources/women/work-and-life/set-action-plan.pdf>
- Quesenberry, J. L. (2006). Career Anchors and Organizational Culture: A Study of Women in the IT Workforce. *Computers and Society*, 342-344.
- Quesenberry, J., Trauth, E.M. & Morgan, A. (2006). Understanding the 'Mommy Tracks': A Framework for Analyzing Work-Family Issues in the IT Workforce, *Information Resources Management Journal* 19(2), 37-53
- Radulescu, C. & Vessey, I. (2009). Methodology in Critical Realist Research: The Mediating Role of Domain Specific Theory. *AMCIS 2009 Proceedings*. Paper 433. <http://aisel.aisnet.org/amcis2009/433/>
- Ragins, B.R., & Cotton, J.L. (1991). Easier said than done: Gender differences in perceived barriers to gaining a mentor. *Academy of Management Journal*, 34, 939-951.
- Ramsey, N. & McCorduck, P. (2005). *Where are the Women in Information Technology? Report of Literature Search and Interviews*. Prepared by the Anita Borg Institute for Women and Technology (www.anitaborg.org) for the National Center for Women & Information Technology. National Science Foundation under Grant No. 0413538. Retrieved August 2nd, 2006, from http://www.anitaborg.org/news/publications/wherearethe_women.pdf

- Reed, M.I. (1997). In praise of duality and dualism: rethinking agency and structure in organizational analysis. *Organization Studies*, 18(1), 21-42.
- Reed, M.I. (2001). Organization, trust and control: a realistic analysis. *Organization Studies*, 22(2), 210-228.
- Reskin, B. (2003). Including Mechanisms in Our Models of Ascriptive Inequality: 2002 Presidential Address. *American Sociological Review* 68(February), 1-21. Retrieved from http://www.asanet.org/images/members/docs/pdf/featured/Reskin_2003.pdf
- Rettenmayer, J., Berry, R. & Ellis, S. (2007). The Image Of The Information System Profession: An Investigation Of Gender Differences. *Journal of Computing Sciences in Colleges*, 22 (5), 46-51.
- Richards, L. (2005). *Handling qualitative data*. London: Sage.
- Risman, B. J. (2004). Gender as a social structure: Theory wrestling with activism. *Gender and Society*, 18(4), 429-450.
- Ritzer, G. & Smart, G. (Eds). (2001). *Handbook of Social Theory*. London: Sage.
- Roan, A. & Whitehouse, G. (2007). Women, Information Technology and Waves of Optimism: Australian Evidence on Mixed-Skill Jobs. In *New Technology, Work and Employment*, 22(1), 21-33, March 2007. Available at SSRN: <http://ssrn.com/abstract=968040> or doi:10.1111/j.1468-005X.2007.00181.x
- Roldan, M., Soe, L. & Yakura, E.K. (2004). Perceptions of chilly IT organizational contexts and their effect on the retention and promotion of women in IT. In *Proceedings of the 2004 SIGMIS Conference on Computer Personnel Research: Careers, Culture, and Ethics in A Networked Environment* (Tucson, AZ, USA, April 22 - 24, 2004). SIGMIS CPR '04. ACM Press, New York, NY, 108-113. DOI= <http://doi.acm.org/10.1145/982372.982399>
- Roodhouse, S. (2006). The Creative Industries: Definitions, Quantification and Practice, Conference Proceedings *Cultural Industries: The British Experience in International Perspective Cultural Industries*, Centre for British Studies, Humboldt-Universität, Berlin, http://www.62bug.net/roodhouse/docs/Humboldt_Univ%20paper06CI.pdf>last accessed 20 Aug 2007.
- Roos, A.P & Gatta, M.L. (2009). Gender (in)equity in the academy: Subtle mechanisms and the production of inequality, *Research in Social Stratification and Mobility*, 27(3), 177-200. Retrieved <http://www.sciencedirect.com/science/article/B82Y4-4W7B0K0-2/2/452c69f50fe8159525758ad1c703395b>.
- Rose, J. (1998). *Evaluating The Contribution Of Structuration Theory To The Information Systems Discipline*. <http://folk.uio.no/patrickr/refdoc/ECIS1998-Rose.pdf>
- Rose, J. & Scheepers, R. (2001). Structuration theory and information system development frameworks for practice, *ECIS 2001: Global Co-operation in the New Millennium*, Bled, Slovenia, 217-231.
- Rowlands B. (2003). Employing Interpretive Case Research to Build Theory of Information Systems Practice, *Australian Journal of Information Systems*, 10(2), 3-22.
- Rowlands B. (2005). Grounded in Practice: Using Interpretive Research to Build Theory. The *Electronic Journal of Business Research Methodology*, 3(1), 81-92 Retrieved 19September 2006 from <http://www.ejbrm.com/vol3/v3-i1/v3-i1-art7-rowlands.pdf>
- Sackmann, S.A. (1992). Culture and subcultures: An analysis of organizational knowledge. *Administrative Science Quarterly*, 37, 140-161.
- Säljö, R. (2004). Learning and technologies, people and tools in co-ordinated activities. *International Journal of Educational Research*, 41, 489-494.
- Saunders, P. (2002). Mutual Obligation, Participation and Popularity: Social Security Reform in Australia, *Journal of Social Policy*, 31(1), 21-38.
- Savickas, M.L. (1997). Career adaptability: An integrative construct for life-span, life-space theory. *The Career Development Quarterly*, 45, 247-259.
- Savickas, M.L. (2005). The theory and practice of career construction. In Brown, S. D. & Lent, R.W. (Eds). (2005). *Career development and counseling: Putting theory and research to work*. New York: Wiley.

- Sayer, A. (1992). *Method in Social Science – A Realist Approach*, 2nd ed. London: Routledge.
- Sayer, A. (2008). Case studies and a single, differentiated reality: A reply to Sue Llewellyn (2007), *Qualitative Research in Accounting & Management*, 5(1), 11 – 14.
- Sayer, A. (2000). *Realism and Social Science*, Sage, London.
- Scanlan, C.L., & Darkenwald, G. (1984). Identifying deterrents to participation in continuing education. *Adult Education Quarterly* 34(3), 155-166.
- Schein, E.H. (1985). *Organizational culture and leadership: A dynamic view*. San Francisco, CA: Jossey-Bass.
- Schön, D.A. (1983). *The Reflective Practitioner. How professionals think in action*, London: Temple Smith.
- Seligsohn, I.J. (1967). *Your Career in Computer Programming*. Julian Messner.
- Selwyn, N. (2002). Defining the 'Digital Divide': Developing a Theoretical Understanding of Inequalities in the Information Age. Occasional Paper 49. Cardiff: Cardiff University. Retrieved August 16, 2006 from <http://www.cf.ac.uk/socsi/ict/definingdigitaldivide.pdf>
- Sen, A. (2000). Social Exclusion: Concept, Applications, and Scrutiny, *Social Development Papers No. 1*, Office of Environment and Social Development, Asian Development Bank.
- Servon, L. & Nelson, M. (2001). Community Technology Centres: Narrowing the digital divide in low-income, urban communities. *Journal of Urban Affairs*, 23(3-4), 279-290.
- Sethibe, T., Campbell, J. & McDonald, C. (2007). IT Governance in Public and Private Sector Organisations: Examining the Differences and Defining Future Research Directions. *18th Australasian Conference on Information System* 5-7 Dec 2007, Toowoomba, Australia.
- Sewell, W.H. (1992). A Theory of Structure: Duality, Agency, and Transformation. *The American Journal of Sociology*, 98(1), (July, 1992), 1-29.
- Shinkle, E. (2008). Video games, emotion and the six senses. *Media Culture Society*, 30, 907-915.
- Shoib, G., Nandhakumar, J. & Jones, M. (2006). Using social theory in information systems research: A reflexive account, in quality and impact of qualitative research. *Proceedings of QualIT2006: Quality and Impact of Qualitative Research*, Brisbane, Australia, Griffith University.
- Sicart, M. (2009). *The Ethics of Computer Games*. Cambridge: The Massachusetts Institute of Technology Press.
- Silverman, D. (2009). *Doing qualitative research* (3rd ed.). London: Sage.
- Silverstone, R. (1999). *Why Study The Media?* London: Sage.
- Skillset (2004). Labour Force Employment survey. Retrieved June 2012 from http://www.creativeskillset.org/uploads/pdf/asset_9920.pdf
- Smith, D.H. (1980). *Participation in Social and Political Activities*, Smith, D.H., Macaulay, J. & Associates (Eds). San Francisco: Jossey Bass.
- Smith, M. (2006). Overcoming theory-practice inconsistencies: Critical Realism and information systems research. *Information and Organization*, 16(3), 191-211.
- Smith, M.J. & Liehr, P.R. (2008). *Middle range theory for nursing*. New York: Springer Publishing.
- Smith, S.M. (2002). Using the Social Cognitive Model to Explain Vocational Interest in Information Technology. *Information Technology, Learning, and Performance Journal*. Spring, 20(1), 1-9.
- Snow, D. & Anderson, L. (1991). Researching the Homeless: The Characteristic Features of the Case Study in Feagin, J., Orum, A., & Sjoberg, G. (Eds.). *A case for case study*. Chapel Hill, NC: University of North Carolina Press. 148-173.
- Spender, D. (1995). *Nattering on the Net: women power and cyberspace*. Melbourne, Spinifex.

- Spiers, J.A. (2004). Tech tips: Using video management/ analysis technology in qualitative research. *International Journal of Qualitative Methods*, 3(1). Article 5. Retrieved 12/10/2007 from http://www.ualberta.ca/~iiqm/backissues/3_1/pdf/spiersvideo.pdf
- Spradley, J.P. (1979). *The Ethnographic Interview*. Fort Worth: Harcourt Brace.
- Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.
- Stake, R. E. (2000). Case studies. In Denzin, N. & Lincoln, Y. (eds.). *Handbook of qualitative research* (2nd ed). 435-454. California: Sage Publications.
- Stangor, C., Carr, C. & Kiang, L. (1998). Activating stereotypes undermines task performance, *Journal of Personality and Social Psychology*, 75, 1191-1197.
- State of Victoria. (2007). *ICT skills research. Attitudes to ICT careers and study among 14-19 year old Victorians (Years 9-12)*. Melbourne, Vic: Multimedia Victoria.
- Stockdale, R. & Stoney, S. (2008). Generating a Gender Balance: making introductory information systems courses a positive experience. *Australasian Journal of Information Systems*, 15(1). Retrieved 12 November 2011 from <http://dl.acs.org.au/index.php/ajis/article/view/477>
- Stones, R. (2005). *Structuration Theory*, Basingstoke, UK: Palgrave-Macmillan
- Stones, R. (2001). Refusing the Realism–Structuration Divide. *European Journal of Social Theory* 4(2): 177–197
- Straub, D., Loch, K., Evaristo, R., Karahanna, E. & Srite, M. (2002). Toward a theory-based measurement of culture. *Journal of Global Information Management*, 10(1), 13-23.
- Strauss, A., Schatzmann, L., Bucher, R., Ehrlich, D. & Sabshin, M. (1964). *Psychiatric Ideologies and Institutions*. Glencoe Ill. The Free Press.
- Summer, M. & Niederman, F. (2002). The impact of gender differences on job satisfaction, job turnover, and career experiences of information systems professionals, in *Proceedings of the 2002 ACM SIGCPR Conference, Kristiansand, Norway*, 154-163.
- Super, D.E. (1992). Toward a comprehensive theory of career development. In Montross, D. & Shinkman, C. (eds.), *Career development: theory and practice*. 35–64. Springfield, IL: Charles C. Thomas.
- Sutton R.I. & Staw, B.M. (1995). What Theory is not. *Administrative Science Quarterly*, 40(3), 371-38
- Swanson, G & Wise, P (1996). *Digital Futures: Women's Employment in the Multimedia Industries*, Canberra: Commonwealth Government of Australia. Women's Research and Employment Initiatives Program (Australia). Department of Employment, Education, Training and Youth Affairs, Canberra : www.workplace.gov.au/NR/rdonlyres/CC7EFA3F-1E9F-4E77-ADC11A97C884CADB/0/digitalfutures.PDF
- Swanson, J. L., and Woitke, M.B. (1997) Theory into practice in career assessment for women: assessment and interventions regarding perceived career barriers. *Journal of career assessment*, Vol. 5, pp.443-462.
- Swartz, D.L. & Zolberg, V.L. (Eds.). (2004). *After Bourdieu. Influence, Critique, Elaboration*, Dordrecht, Boston, London: Kluwer Academic Publishers.
- Takahashi, D. (2010). *Ethics Of Game Design*. Gamasutra. Retrieved. Aug 2010 from http://www.gamasutra.com/view/feature/2181/ethics_of_game_design.php
- Tapia, A., (2006). Hostile Work Environment.Com: Increasing Participation of Underrepresented Groups, Lessons Learned from the Dot-Com Era. *Database for Information Systems Research*. 37(4), 79-98.
- Tapia, A., & Kvasny, L. (2004). Recruitment is never enough: retention of women and minorities in the IT workplace. *Proceedings of the ACM Conference on Computer Personnel Research: Careers, Culture, and Ethics in a Networked Environment*, Tucson, 84-91.
- Tapia, A., Kvasny, L. & Trauth, E. (2004). Is There an IS Retention Gap for Women and Minorities? The Case for Moving In versus Moving Up, In Igbaria, M. and Shayo, C. (Eds.), *Strategies for Managing IS/IT Personnel*, Idea Group Publishing, Hershey: Idea Group, 143-164.
- Tashakkori, A., & Teddlie, C. (Eds.). (2003). *Handbook of mixed methods in social and behavioral research*. Thousand Oaks, CA: Sage.

- Taylor, T.L (2008). Becoming a Player: Networks, Structures, and Imagined Futures, in Kafai, Y. Heeter, C. Denner, J. and Sun, J. (Eds.). *Beyond Barbie and Mortal Kombat: New Perspectives on Gender, Games, and Computing*, Cambridge: The MIT Press.
- Taylor, C. & White, S. (2000). *Practising reflexivity in health and welfare: Making knowledge*. Buckingham: Open University Press.
- Teague, J. (1997). Structured Review of Reasons For the Under Representation of Women in Computing, *Proceedings of the Second Australasian Conference on Computer Science Education*, University of Melbourne, Australia, July 2-4.
- Thomas, R. & Allen, A. (2006). Gender differences in students' perceptions of information technology as a career. *Journal of Information Technology Education*, 5(5), 165-178.
- Thompson, J. (1984). *Studies in the theory of ideology*. Cambridge, UK: Polity.
- Thomson, A.J., & Schmoldt D.L. (2001). Ethics in computer software design and development. *Computers and Electronics in Agriculture*, 30 (2001) 85–102
- Thrift, N. & May, J. (Eds.). (2001). *Timespace: Geographies of Temporality*. London: Routledge
- Timms, C., Courtney, L. & Anderson, N. (2006). Secondary girl perceptions of advanced ICT subjects: Are they boring and irrelevant? *Australian Educational Computing Research News*, 21(2), 3-8.
- Trauth, E.M. (1999). Who Owns my Soul? The Paradox of Organizational Productivity in a Culture of Individualism. *Proceedings of Association for Computing Machinery Special Interest Group on Computer Personnel Research Annual Conference: Managing Organizational Knowledge for Strategic Advantage - The Key Role of Information Technology and Personnel* (New Orleans, L.A.). 159-163.
- Trauth, E.M. (2001). *Qualitative Research in IS: Issues and Trends*, Idea Group Publishing, Hershey, PA.
- Trauth, E.M. (2002). Odd Girl Out: An Individual Differences Perspective on Women in the IT Profession, *Information Technology and People*, 15(2), 98-118.
- Trauth, E.M. (2006). Theorizing Gender and Information Technology Research, in *Encyclopaedia of Gender and Information Technology*. Trauth, E.M. (Ed.), Hershey, PA: Idea Group Publishing: 1154-1159.
- Trauth, E.M. (2011). What Can We Learn from Gender Research? Seven Lessons for Business Research Methods. *The Electronic Journal of Business Research Methods*. 9(1), 1-9, available online at www.ejbrm.com
- Trauth, E.M., & Howcroft, D. (2006). Critical Empirical Research in IS: An Example of Gender and IT, *Information Technology and People*. Special Issue on Critical Research in Information Systems 19(3) 272-292.
- Trauth, E.M., Joshi, K.D., Kvasny, L., Chong, J., Kulturel, S. & Mahar. J. (2010). Millennials and Masculinity: A Shifting Tide of Gender Typing ICT? *Proceedings of the 16th Americas Conference on Information Systems* (Lima, Peru, August).
- Trauth, E.M., Nielsen S.H., & von Hellens, L.A. (2003). Explaining the IT gender gap: Australian stories for the new millennium. *Journal of research and practice in information technology*, 35(1), 7-20. Retrieved August 2nd, 2005, from ACM Portal from The ACM Digital Library database.
- Trauth, E.M., & Quesenberry, J.L. (2005). Individual inequality: women's responses in the IT profession, paper presented at the *Women, Work and IT Forum*.
- Trauth, E.M., & Quesenberry, J.L. (2007). Gender and the information technology workforce: issues of theory and practice, in Young, P., Huff, S. (Eds), *Managing IT Professionals in the Internet*, Idea Group Publishing, Hershey, PA, 18-36.
- Trauth, E.M., Quesenberry, J.L. & Huang, H. (2008). A Multicultural Analysis of Factors Influencing Career Choice for Women in the Information Technology Workforce, *Journal of Global Information Management*, 16(4), 1-23.
- Trauth, E.M., Quesenberry, J. & Huang, H. (2009). Retaining women in the U.S. IT workforce: theorizing the influence of organizational factors. *European Journal of Information Systems*. 18(5), 476-497. <http://dx.doi.org/10.1057/ejis.2009.31>

- Trauth, E.M., Quesenberry, J. & Morgan, A.J. (2004). Understanding the Under Representation of Women in IT: Toward a Theory of Individual Differences. *Proceedings of the ACM SIGMIS Computer Personnel Research Conference: Careers, culture, and ethics in a networked environment*, SIGMIS'04, April 22-24, 2004. 114-119. Tucson, AZ. ACM Press: USA. DOI=10.1145/982372.982400 <http://doi.acm.org/10.1145/982372.982400> Retrieved August 2nd, 2005, from ACM Portal from The ACM Digital Library Database.
- Trauth, E.M., Quesenberry, J. & Yeo, B. (2005). The influence of environmental context on women in the IT workforce. *Proceedings of the 2005 ACM SIGMIS CPR conference on Computer personnel research*. April 14-16, 2005, Atlanta, Georgia, USA, 24 – 31. ACM Press: USA. Retrieved August 2nd, 2005, from ACM Portal from The ACM Digital Library Database.
- Trauth, E. M., Quesenberry, J. L. & Yeo, B. (2008b). Environmental influences on gender in the IT workforce. *ACM SIGMIS Database*, 39(1), 8-32.
- Tsoukas, H. (1989). The validity of idiographic research explanations. *Academy of Management Review*, 14(4), 551-561.
- Turkle, S. (1995). *Life on the screen: Identity in the age of Internet*. New York: Simon & Schuster.
- Turner, J.H. (1991) *Structuration Theory of Anthony Giddens*. In *The Structure of Sociological Theory* (5th ed). California: Wadsworth, pp. 519 – 539.
- Turner, S. V., Bernt, P. W. & Pecora, N. (2002). Why women choose information technology careers: Educational, social and familial influences. *Proceedings of the annual meeting of the American Educational Research Association*, New Orleans, LA.
- Turner, T. (2003). Multimedia is much more fun but I still don't want to do IT. *Proceedings of the 2003 Australian Women in IT Conference*. Retrieved September 19, 2006 from http://www.auswit.org/2003/papers/3-2_Turner.pdf
- UNCTAD (United Nations Committee on Trade, Aid and Development). (2008). *Creative economy report*. Geneva: UNCTAD.
- Valian, V. (1998). *Why so slow?: The advancement of women*. Cambridge: The MIT Press.
- Van Manen, (1990). *Researching Lived Experience: Human Science for an Action-Sensitive Pedagogy* (London, Ontario: The University of Western Ontario, 1990), 175.
- Varella, C. & Harre, R. (1996). Conflicting varieties of realism: Causal powers and the problems of social structure, *Journal for the Theory of Social Behaviour*, 26(3).
- Venkatesh, V. & Morris, M.G. (2000). Why Don't Men Ever Stop to Ask for Directions? Gender, Social Influence, and Their Role in Technology Acceptance and Usage Behavior? *MIS Quarterly*, 24(1), 115-139.
- Verba, S., & Nie, N.H. (1972). *Participation in America*. New York: Harper & Row.
- Vigdor, L. (2011). A Techno-Passion that is Not One: Rethinking Marginality, Exclusion and Difference. *International Journal of Gender, Science and Technology*, 3(1).
- Volkoff, O., Strong, D.M. & Elmes, M.B. (2007). Technological Embeddedness and Organizational Change, *Organization Science*, 18(5), 832-848.
- von Hellens, L., Clayton, K., Beekhuyzen, J., & Nielsen, S. (2009). Perceptions of ICT careers in German schools: an exploratory study. *Journal of Information Technology Education*, 8, 211-228.
- von Hellens, L., Nielsen, S.H. & Beekhuyzen, J.P. (2004). An exploration of the dualisms in the female perceptions of IT work. *Journal of Information Technology Education*, 3, 103-116. Retrieved August 2nd, 2005, from ACM Portal from The ACM Digital Library Database.
- von Hellens, L., Nielsen, S.H. & Beekhuyzen, J. (2003). Women working in the IT industry: Challenges for the new millennium. *International Business and Economics Research Journal*, 1(11).
- von Hellens, L., Nielsen, S., & Trauth, E.M. (2001). Breaking and entering the male domain: Women in the IT industry. In *Proceedings of the 2001 ACM SIGCPR Computer Personnel Research Conference*.

- von Hellens, L., & Nielsen, S. (2001). Australian women in IT. *Communications of the ACM*, 44(7), 46-52. Retrieved August 2nd, 2005, from ACM Portal from The ACM Digital Library Database.
- Wajcman, J. (1991). Feminism Confronts Technology. *Proceedings from 'In Action for Equity: The Second Decade'*. The Sixth international GASAT conference, Vol. 2. Allen and Unwin, Sydney.
- Wajcman, J. (2000). Reflections on gender and technology studies: in what state is the art?' *Social Studies of Science*, (30)3, pp. 447-64
- Walsham, G. (1993). *Interpreting Information Systems in Organisations*, Wiley, Chichester.
- Walsham, G. (1995a). The emergence of interpretivism in IS research. *Information Systems Research*, 6(4), 376-394.
- Walsham, G. (1995b). Interpretive case studies in IS research: nature and method, *European Journal of Information Systems* (4), 74-81.
- Walsham, G. (2002). Cross-cultural software production and use: A structurational analysis. *MIS Quarterly*, 26(4): 359-380.
- Walsham, G. (2005). Learning about Being Critical. *Information Systems Journal*, 15, 111-117.
- Walsham, G. (2006a). *Doing interpretive research*. Summary for seminar. Retrieved August 2010 http://www.dipartimenti.unicatt.it/segesta_Walsham.pdf
- Walsham, G. (2006b). Doing interpretive research, *European Journal of Information Systems*, 15, 320-30.
- Walters, K. (2006). EXIT: Why Women are Shunning the Technology Industry, *Business Review Weekly*, July, 26-32.
- Walton, M. & Duncan, I. (2002). *Creative Industries in New Zealand Economic Contribution*, Industry New Zealand, Wellington, <http://www.nzte.govt.nz/common/files/nzier-mapping-ci.doc> last accessed 21/08/2007.
- Warne, L., Bandias, S., and Fuller, D. (2011). The Employment Experiences of Women in the Australian Information Communication Technology Industry. *Journal of Economic and Social Policy*, 14(1), Article 2. Available at: <http://epubs.scu.edu.au/jesp/vol14/iss1/2>
- Weaver, G. and Gioia D. (1994). Paradigms Lost: Incommensurability vs Structurationist Inquiry, *Organization Studies*, 15(4), 565-590.
- Webb, P., and Young, J. (2005). Perhaps it's time for a fresh approach to ICT gender research? [Electronic version] *Journal of Research and Practice in Information Technology*, 37(2), 147-160. Retrieved September 17, 2006 from, <http://www.jrpit.acs.org.au/jrpit/JRPITVolumes/JRPIT37/JRPIT37.2.147.pdf>
- Weber, R. (2003a). Editors Comments: The reflexive researcher, *MIS Quarterly* 27, (4). September, v-xiv.
- Weber, R. (2003b). Editors Comments: theoretically Speaking, *MIS Quarterly* 27(3). September, iii-xiii.
- Webster, M., Jr., and Whitmeyer, J.M. (1999). A Theory of Second-Order Expectations and Behavior. *Social Psychology Quarterly* 61, 17-31.
- Weick, K. E. (1989). Theory construction as disciplined imagination. *Academy of Management Review*, 14(4), 516-531.
- Weick, K.E. (1995). What theory is not, theorizing is, *Administrative Sciences Quarterly*, 40(3), 385-390.
- Weisinger, J. and Trauth, E. (2003). The Importance of Situating Culture in Cross-Cultural IT Management, *IEEE Transactions on Engineering Management*, 50(1), 26-30.
- Wenger, E. (1998). *Communities of Practice: Learning, Meaning, and Identity*. Cambridge: Cambridge University Press.
- Wenger, E, McDermott, R., Snyder, W. M. (2002). *Cultivating Communities of Practice (Hardcover)*. Harvard Business Press; 1 edition. ISBN 978-1-57851-330-7.
- Wengraf, T. (2001). *Qualitative Research Interviewing: Biographic Narrative and Semi-Structured Methods*, London, Sage.

- Whetten, D.A. (1989). What constitutes a theoretical contribution? *Academy of Management Review*, 14(4), 490-495.
- Whitehouse, G., and Diamond, C. (2005). Reproducing gender inequality: Segregation and career paths in information technology jobs in Australia. *Keynote address to the 19th Annual Conference of the Association of Industrial Relations Academics of Australia and New Zealand (AIRAANZ)*, 10 February 2005, University of Sydney, Sydney.
- Wikgren, M. (2005). Critical Realism as a philosophy and social theory in information science? *Journal of Documentation*, 61(1), 11-22.
- Williams, R. (1983). *Keywords: A Vocabulary of Culture and Society*. London: Fontana
- Willmott, R., (1997). Structure, Culture and Agency: Rejecting the Current Orthodoxy of Organisation Theory. *Journal for the Theory of Social Behaviour*, 27(1), 0021-8308, Blackwell, Oxford.
- Wilson, M. (2004). A conceptual framework for studying gender in information systems research. *Journal of Information Technology*, 19, 81-92.
- WIT (2006). Women in Information Technology - WIT Home Page/Mission. Accessed September 17, 2006 from, <http://www.wit.org.au>
- Witkowski, E. (2006). *Soft Reboot: Young Women and Technology in Denmark*. Independent research for IBM Denmark.
- Witzel, A. (2000, January). The problem-centered interview. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research* [On-line Journal], 1(1). Available at: <http://qualitative-research.net/fqs>
- Women on the Web Report (2010). *How Women are Shaping the Internet*. Reston, VA Retrieved Aug 2010 <http://mashable.com/2010/07/28/women-on-the-web/>
- Woolley, H.T. (1910). A Review of the Recent Literature on the Psychology of Sex, *Psychological Bulletin* 7 (18), 335-42.
- Yeung, H.W. C. (1997). Critical Realism and realist research in human geography: A method or a philosophy in search of a method? *Progress in Human Geography*, 21(1), 51-74.
- Yin, R. (1984). *Case study research: Design and methods* (1st Edition). Beverly Hills, CA: Sage Publishing.
- Yin, R. (1993). *Applications of case study research*. Beverly Hills, CA: Sage Publishing.
- Yin, R. (1994). *Case study research: Design and methods* (2nd ed.). Beverly Hills, CA: Sage.
- Yin, R. (2003). *Case study research: Design and methods* (3rd ed., Vol. 5). Thousand Oaks, CA: Sage.
- Yin, R., (2004). *The Case Study Anthology*, Sage, Thousand Oaks, CA
- Yin, R (2011). *Applications of Case Study Research*. Third Edition. Sage.
- Yow, V. R. (1994). *Recording oral history: A practical guide for social scientists*. Thousand Oaks, CA: Sage.
- Zheng, Y. & Walsham, G. (2008). Inequality of what? Social exclusion in the e-society as capability deprivation, *Information Technology and People*, 21(3), 222-43.

Appendices

APPENDIX 1: PUBLICATIONS STEMMING FROM THE RESEARCH

Type	Publication	Date/ Country
Conference presentation	Geneve, A., (2011). "Five Acts of Agency by women in the Australian Digital Content Industry". <i>Console-ing Passions conference</i> , 27-29 July, Adelaide, Australia 2011	2011 Australia
Book Chapter	Geneve, A., and Ganito, C. (2011) "Women and Technology: Five Acts of Acts of Agency" in Araya, D. Breindl, Y, Houghton, T (Ed.) <i>Nexus: New Intersections in Internet Research</i> . Peter Lang:USA ISBN 978-1-4331-0970-6 pb.	2011 USA
Conference panel	Ganito, C., Breindl, Y., Haché, A., Geneve, A., Blodgett, B., Ferreira, C., Lopez, E., Vergés Bosch, N., (2010) Panel: Quantity and Quality: Patterns of Female Engagement with ICTs. <i>Equity Internet Research 11</i> , October 23-24, 2010,	2010 Sweden
Book Chapter	Geneve, A., and Christie, R.J. and Nelson, K. J. (2009) Women's participation in the Australian Digital Content Industry: initial case study findings. In: Prpić, K and Oliveira, Laura and Hemlin, S (Eds.) <i>Women in Science & Technology</i> . Institute of Social Research-Zagreb Sociology of Science and Technology Network of ESA (European Sociological Association), Zagreb, Croatia, pp. 139-161. ISBN: 9789536218417	2009 Croatia
Conference presentation	Geneve, A., (2011). <i>Sphere of Influence</i> and 'Five Acts' of 'Acts of Agency'. <i>OzWIT 2009: Australian Celebration of Women in ICT</i> , Melbourne, Australia.	2009 Australia
Conference paper	Geneve, A., and Nelson, K.J. and Christie, R. J. (2008) Passion, women and the games industry: influences on women's participation in the Australian Digital Content Industry. In: <i>Women in Games</i> , 10-12th September 2008, Warwick, United Kingdom. (Unpublished)	Sept 2008 United Kingdom
Conference paper	Geneve, A., Nelson, K., and Christie, R. (2008). Girly Girls and Geeky Guys. Pathways of desire: Women's participation in the Digital Content Industry. <i>Investigating the theory and practice of gender and sexuality in the workplace</i> . 12 - 13 June 2008. The Institute of Advanced Studies, University of Surrey, United Kingdom.	June 2008 United Kingdom
Conference paper	Geneve, A., Nelson, K., and Christie, R. (2008). How did 'we' get here? Pathways of desire: Women's participation in the Digital Content Industry. <i>The European Sociological Association SSTNET (Sociology of Science and Technology Network) Workshop</i> , 5 - 6 June 2008, Zagreb, Croatia.	June 2008 Croatia
Doctoral consortium paper	Geneve, A. (2005). Does confidence assist women in responding to factors that influence their participation in Information Communication Technology (ICT)? <i>2nd International Conference on Qualitative Research in IT & IT in Qualitative Research-Doctoral Consortium</i> . November 23 - 25, 2005, Griffith University Brisbane, Australia.	Nov 2005 Australia

* peer-reviewed

APPENDIX 2: EXAMPLE OF LITERATURE INDICATING WOMEN ARE UNDER-REPRESENTED IN THE DCI AND RELATED ICT INDUSTRY IN AUSTRALIA AND INTERNATIONALLY

	Evidence	Country	ICT	DCI	Key points
Industry	Special interest group (SIG) IGDA (current) http://archives.igda.org/women/	USA		x	Aims to address the under-representation of women in the games industry.
	IGDA Diversity report (Gourdin, 2005)			x	Identifies women are under-represented in the games industry internationally, although most respondents were from the USA.
Academic	Communications of the ACM (1990)		x		Suggests many women opting for careers in computing drop out of the academic pipeline.
	Communications of the ACM (1995)		x		Special issue on women in computing features a historical overview as well as surveys of conditions in various countries.
	Communications of the ACM ACM (2002)		x		Propose recommendations to recruit and retain women in computing at the undergraduate level, including mentoring and role models.
	ACM SIGCSE Bulletin (2002)		x		Identifies the pipeline shrinkage problem for women in computer science as being a well-known and documented phenomenon.
Government	Women in the Smart State Directions Statement 2003-2008 (Queensland Government, 2003)	QLD Australia	x	x	Not limited to ICT but does not explicitly mention DCI.
	Queensland Government. (2006b)	QLD Australia	x	x	Makes reference to “supporting women’s participation in emerging industries” (Queensland Government, 2006b, p.1) but does not explicitly mention DCI.
	partICipaTion Summit (Queensland Government, 2006a)	Australia	x		Identified a “need for the industry to ensure [...] work environment is attractive and flexible to attract and retain people in the ICT profession”.
	AAUW, 2004	USA	x		Outlines the increased government funding in the United States towards increasing the number of girls and women participating in science, technology, engineering and math.
	Queensland Government (2001)Beyond the Pink Collar: (Premiers Council for Women)	QLD Australia	x	x	Profile of women’s positions in the Queensland workforce and an analysis of the impact of key Government policy and initiatives on work-related outcomes for women.

APPENDIX 3: EXAMPLES OF STRATEGIES FOSTERING WOMEN PARTICIPATION

Table 55 Examples of strategies fostering girls and women's participation

Strategy /Initiative	Industry ¹	Area ²	Country	Example of type of activity	Typical cohort
WINIT http://www.winitproject.com/index.html	ICT	Education	UK, AU	Mentoring	Student university
Digital Divas http://www.digitaldivas.com.au/	ICT	Education	AU	Curriculum, role models,	Students aged 12-15
WIT http://www.wit.org.au/	ICT/DCI	Industry, Government	UK, AU	female role models, networking,	Board readiness programs, mentoring programs for women in STEM industries
IGDA mentorship scheme http://www.igda.org/scholars/	DCI (Games)	Industry	USA ³	Mentoring	Online mentoring for games workers with a focus on women, now a scholarship program
Sun SEED mentoring program http://www.facebook.com/pages/SEED-Engineering-Mentoring-Program/165811522614	ICT	Education, Industry	AU	Mentoring, opportunity for experience	Industry based work experience, now a Facebook community
Technology Takes you Anywhere https://www.learningplace.com.au/defaultteqa2.asp?orgid=48&suborgid=665	ICT/DCI	Education	AU	role models, hands on experience	Once per year visit by school aged girls to event(QLD)
Diploma of Multimedia (Women) ⁴	DCI	Education	AU	Skills development	Training
Girl Geek Coffee Club https://sites.google.com/site/girlgeekcoffees/	ICT/DCI	Education	AU	Networking	Networking for female university students
Geek Girl Dinners http://girlgeekdinners.com/		Education, Industry	UK ³	Networking	Networking focus for female students, industry workers
Go for IT gURL http://www.qut.edu.au/study/fees-and-scholarships/scholarships-and-prizes/go-for-it-gurl-merit-scholarship	ICT	Education	AU	Role models, information	Once per year visit to university (QUT), late school aged now merit based scholarship
Go girl go for IT http://gogirl.org.au/	ICT	Education	AU	School to university pathway	Once per year visit by school aged girls to event (Victoria)
Women in Games http://www.womeningames.com/	DCI (Games)	Industry	USA	Networking, information for games workers	Online website offering resources such as social networking
WITI http://www.witi.com/	ICT	Industry	AU ³	Networking	Online website and in person meetings to WITI to help women advance by providing access to - and support from - other professional women working in all sectors of technology http://www.witi.com/
Google Anita Borg scholarship http://www.google.com.au/anitaborg/	ICT	Education	AU, USA	Networking, financial	Offers female recipients a \$5,000 scholarship and visit to Googleplex in Sydney, Australia
FITT Females in Information Technology & Telecommunications http://www.fitt.org.au/					Promotes the interests of women working in the Information and Communications Technology (ICT) industry in Australia
Women in Games Australia http://www.womeningames.org.au/	Games	Industry	AU	Information, networking	An organisation run for women in the gaming industry Last post nov 2011

¹ Industries often overlap, ² does not closely examine sources of funding ³ international strategy ⁴ last offered as a gender specific program in 2007

APPENDIX 4: INFLUENCES ON WOMEN'S PARTICIPATION AS IDENTIFIED IN PREVIOUS RESEARCH

Table 56 provides examples of influences on women's participation (in both the DCI and ICT industry) as identified from the literature. The meta analysis of literature was used to sensitise the researcher and inform the development of Framework 1, an initial guiding analytical model (see Section 3.1).

Table 56 Example of influences on participation as identified in ICT and DCI literature

Influence	Author	Year	***	Industry sector	Example of influence	Women specific/cohort ^{t*/**}
Culture-family	Trauth, Quesenberry, Huang (2008)	2006	USA	IT	Culture may differ between countries	Y
Organizational culture	Trauth, Quesenberry, Huang (2009)	2009	USA	IT		Y
	Roldan, Soe, Yakura (2004), Webb and Young(2005) citing Cuny and Aspray (2000)	-	USA AU	IT IT	Chilly culture Competitive 'aggressive' work atmosphere	Y
	Trauth, Quesenberry and Yeo (2005)	2005	USA		Attitudes, values regarding women, women working and women working in IT	Y
	Webb and Young (2005) citing von Hellens, Nielsen and Trauth (2001)	-	AU		Dominant male culture in IT organisations	Y
Life course	Castano and Webster (2011)	2011	*>		Views influences over a life course perspective	Y
Occupational stereotypes	Margolis and Fisher(2002); Jepson and Perl (2002); MacKnight (2001)	-	UK USA	ICT (IT, CS)	The media reinforces imagery of computer 'nerds' and 'geeks'	Y
	Stockdale and Stoney (2008), MacKnight (2001)	-	-	IT	Stereotype of lonely, "nerdy" work ...turns women off from seeking IT jobs.	Y
	Courtney, Lankshear, Anderson and Timms (2009)	2009	AU	ICT	Students and workers perceptions of a career in the IT industry differ	Y
	Gill (2002)		UK/ EU	DCI (new media)	New Media seen as cool, creative egalitarian.	
	State of Victoria (2007)	2007	AU	ICT/DCI (multimedia)	Multimedia seen as more fun than IT	Y High school students
Norms surrounding gender stereotypes	McGrath-Cohoon and Aspray (2006)	2006	USA	ICT	Female identity not compatible with computers for example, men presented as focused on computer and lacking social interests	
	Taylor (2008, p. 55)	2008	-		The lack of women gamers is linked to the "image of what a "real women" is	
Mentors	Trauth et al., (2004); Trauth et al., (2009); Tapia and Kvasny (2004)	-	USA	ICT (IT)	A lack of mentoring opportunities for women; women are more likely to have fewer mentors. Reluctance of male supervisors to coach and mentor women subordinates	Y
Media	Jepson and Perl (2002)	2002	-	ICT (IT)	"Negative media" convey the perception that computer-related careers are "too nerdy"	Y Education context, student cohort
Role models	Jepson and Perl (2002)	2002		ICT(IT)	Lack of female role models	
Male majority	Griffiths, Moore and Richardson (2007)	2007	UK	ICT	Masculinisation due to majority	
Social networks	Morgan, Quesenberry & Trauth (2004)	2004	USA		Networks are important	

Table continued on next page

Influence	Author	Year	***	Industry sector	Example of influence	Women specific/cohort */**
Resource content	Klawe (2002)	2002	USA	ICT	Boy's decision to pursue career linked to playing games, games content is targeted towards males	N School aged
Resource access (technology)	Adya and Kasier (2005)	2005	USA	IT	Access to technology in home and at school	Y Young girls
Long hours	Gill (2002); Griffiths, Moore and Richardson (2007); Prescott and Bogg (2010)	-	UK UK UK	DCI ICT DCI (games)	Long hours challenge life work balance	Y New media workers , ICT workers
Financial rewards	Panteli, Stack, & Ramsay, (1999)	1999	UK	ICT	Industry employment often contract based adds to employee insecurity, low pay	Y
Available information	Jepson and Perl (2002)	2002	USA	ICT	Lack of information about certain career pathways	Y
	Tapia, Kvasny and Trauth in Igabaria and Shayo (2004)	2004	USA	ICT	insufficient information regarding role expectations	Y
Rewards	Joseph, Ng, Koh and Ang (2006)	2005	USA	ICT	Reward and advancement incentives are important motivators	N IT professionals
Economy	Trauth, Quesenberry and Yeo (2008)	2008	USA	ICT	Size of the information economy, household income and cost of living	Y
Geography	Trauth, Quesenberry and Yeo (2008)	2008	USA	ICT	Geographical regions may offer different characteristics	Y
Media	Margolis and Fisher (2002)	2002	UK/ EU		Magazines	Yes University students
Identity	Moore, Griffiths and Richardson (2005)	2005	UK /EU	IT	Identity tensions between women and technical	Yes
Personality traits	Trauth (2002), Trauth, Quesenberry, Yeo (2005); Trauth, Quesenberry, Yeo (2008)	2002	USA		Confidence in women fosters participation, characteristics such as being strong; internal perseverance	Yes IT workers
Skills capacity	Roan and Whitehouse, (2007)	2007	AU	DCI	Need for creative and not only technical skills	Yes DCI workers
	Margolis and Fisher (2002)	2002	UK/ EU	IT	Women face an 'experience gap' in regards to computer/technology use	Y University student
Self-efficacy	Hackett (1995)	1995		ICT (IT)	Self-efficacy fosters participation	Yes University students (male and female)
Psychological perceptions	Gilligan(1982)	1982	-		Psychological differences between males and females	
Need for social interaction	Misic & Graf, (1999)	1999	-	DCI	Limited opportunities for social interaction	N
	Pratt (2000)	2000	USA	DCI	Workers need for social interaction	N
	Berg et al. 2002 in McGrath-Cohoon and Asprey(2006)	2002	USA	ICT	Women value jobs they believe had social interaction and compatibility with social issues	Y Engineering students
Work-life balance	Trauth, Quesenberry, Huang (2006); Griffiths and Moore (2010); Moore, A. K., Griffiths, M., & Richardson, H. (2005b).	-	USA UK UK	IT	Women faced challenge in maintaining a life work balance	Y
Personal values	McGrath-Cohoon and Asprey(2006)	2006	USA		An IT career was a "waste of intelligence" and women wanted careers that "made a difference".	Y
Natural ability to work with computers	Trauth, Quesenberry, Yeo(2008)	2008	USA			Y

*Study appeared to focus on women; however, the research may not have clearly indicated this. ** Identifies cohort if empirical study or if a review specifically mentions a cohort for example school aged children, *** Country of origin (may however encompass global aspects)

APPENDIX 5: MODELS REGARDING WOMEN’S PARTICIPATION FROM THE ICT LITERATURE

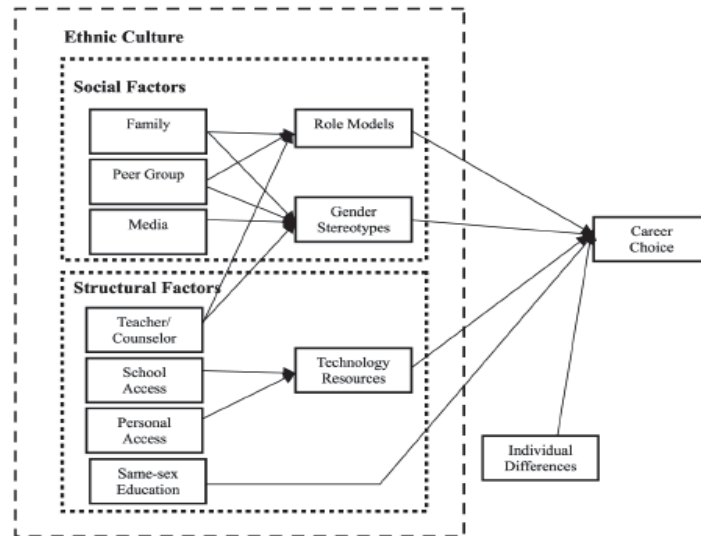


Figure 33: Model of Girls Career Choices (Adya and Kaiser, 2005).

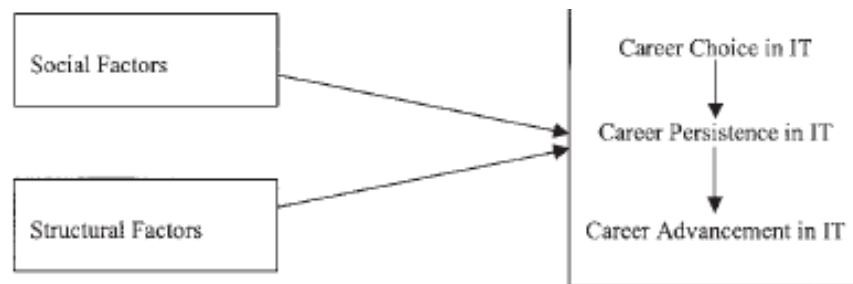


Figure 34: Career stage model (Ahuja, 2002)

Major themes	Sub-themes
Supermum factor	societal expectation; work family balance; support
Serendipity	skills; adaptive behaviour; outlook
Culture	paucity; definition; gender traits; distinction

Figure 35: Webb and Young’s (2005) major and sub-themes

Table 57 Teague's (1997) application of the PRECEDE-PROCEED model

PRECEDE	The first 5 phases	
Phase 1	Social Diagnosis	The focus of this phase is to identify and evaluate the social problems which impact the quality of life of a target population
Phase 2	Epidemiological Diagnosis	Identify behavioural and environmental factors related to the quality of life issues such as statistics. Based on these two phases develop goals or outcomes for the program identifying who, what, how and when.
Phase 3	Behavioural & Environmental Diagnosis	Determination of the importance and relative changeability of each behavioural cause. Also personal factors not those controlled by behaviour.
Phase 4	Education & Organizational Diagnosis	<p>Three kinds of causes are identified - predisposing factors, enabling factors, and reinforcing factors. The critical element of this phase is the selection of the factors which if modified, will be most likely to result in behaviour change.</p> <p>Predisposing Factors - any characteristics of a person or population that motivates behaviour prior to the occurrence of that behaviour</p> <ul style="list-style-type: none"> • knowledge • beliefs • values • attitudes <p>Enablers - characteristic of the environment that facilitate action and any skill or resource required to attain specific behaviour</p> <ul style="list-style-type: none"> • accessibility • availability • skills • laws (local, state, federal) <p>Reinforces - rewards or punishments following or anticipated as a consequence of behaviour. They serve to strengthen the motivation for behaviour.</p> <ul style="list-style-type: none"> • family • peers • Teacher.
Phase 5	Administrative & Policy Diagnosis	Administrative and organizational concerns which must be addresses prior to program implementation aimed at changing behaviour.
PROCEED	The second 4 phases	
Phase 6	Implementation	
Phase 7	Process Evaluation	
Phase 8	Impact Evaluation	
Phase 9	Outcome Evaluation	

Teague applied the first five stages of the model (Predisposing, Reinforcing and Enabling Constructs in Educational/environmental Diagnosis and Evaluation, and Policy, Regulatory, and Organisational Constructs in Educational and Environmental Development)

APPENDIX 6: APPROACH TO ESTABLISHING 'TRUSTWORTHINESS' OF FINDINGS


Table 58 Approach to establishing 'trustworthiness' of the research findings

Trustworthiness criteria	Recommended technique	As implemented in the investigation	Discussed in Section
Credibility (or internal validity in Positivism)	Prolonged engagement	- Phase 1 data transcribed by researcher and verified by researcher against original video recording - multiple analysis cycles of empirical data adds to prolonged engagement	
	Rich thick description (Creswell, 2003)	- plausible and context rich account - use of participants quotes to illustrate concepts	
	Member check (Dallimore, 2000)	- following the interviews, participants were provided with a transcript of the interview	
	Persistent observation (Lincoln and Guba, 1985)	- site visits wherever possible	
	natural history test of validity (Neuman, 2000)	- philosophical assumption and method clearly articulated in a logical manner	
	Triangulation of evidence (Patton, 1990; Creswell, 2003)	- converging conclusion from triangulation of method, data and theory	Triangulation 4.4.1
	Presenting information that counters themes (Creswell, 2003)	- theoretical scaffold encouraged seeing data from multiple levels of abstraction.,- Critical Realism and agency theories present congruent but different perspectives	
Dependability (Reliability in Positivism)	Reliability audit, interview protocol, establishment of a case study database (Eisenhardt, 1989; Merriam, 1998).	- question-bank - interview protocol - case study database	Protocols 4.4.3
	Clarifying researcher bias (Merriam, 1998; Creswell, 2003)	- making clear the researchers' assumptions about her world view and theoretical orientation	
	Confirmability audit (Lincoln and Guba, 1985)	- record of data collected (including videotaped interview and transcripts) as a part of the chain of evidence. - a commitment to presenting transcript material with as little editing as possible	Chain of evidence 4.4.3
	reflexivity (Lincoln & Guba, 1985)	- extensive use of memoing to monitor any personal bias, research changes	Reflexivity 4.4.1
	Use of established procedures (Miles & Huberman, 1994).	- articulating procedures	
Transferability (Ext Validity, generalisability in Positivism)	Thick description (Corden and Sainsbury, 2006)	- findings use verbatim quotes extensively, to illustrate the actual data emerging from the study	
	adequate amount of data (Morse, 1994)	- multiple sources of evidence - consideration of sampling strategy	
	Use of established theories; Tsoukas 1989; Yin 1994)	- MTS is used to understand interactions between the environment and the agent	
	Transferability of findings	- conceptual frameworks applied to other domains (for example, mobile phone and education; see 7.5)	
Confirmability (Objectivity in Positivism)	validity of subjective interpretation (Miles and Huberman, 1994)	High level of reflexivity, bracketing, tools such as researchers diaries. Citing research on bias to show awareness.	Reflexivity 4.4.1
	audit trail (Miles and Huberman, 1994) or "inquiry audit" (Lincoln and Guba, 1985, p. 317)	Audit trail clearly shows the framing of the study and collection of data, Development of diagrams demonstrates the internal consistency of the information collected. Nvivo file captures progressive coding.	
	rival explanations and alternate instances (Miles and Huberman, 1994)	Use of multiple theories in MTS, abstracted mechanisms grounded in empirical data.	Explanation 4.4.1

APPENDIX 7: CASE STUDY ORGANISATION VIGNETTES

* Name not provided to ensure participant anonymity ** large multinational

Sample	Organisation	ID	Description	Addendum
Games				
1	Krome	B	<p>Krome Studios http://www.kromestudios.com</p>  <p>Primary product and service: One of Australia's largest video game developers and a leading independent development studio worldwide. Products include TY the Tasmanian Tiger™ (Krome's own IP)</p> <p>Employs: 300 full-time employees spread across studios in Brisbane, Melbourne, and Adelaide. (see addendum).</p>	<p>Significant number of staff 'let go' during 2009 and 2010.</p> <p>See http://www.tsume.com/australasia/australia/news/151010/serious-trouble-at-krome-studios</p>
2	THQ Australia	H	<p>THQ Studio Australia http://www.thqstudioaustralia.com</p> <p>International games company with local studios.</p>	<p>Closures Aug 2011 http://www.smartcompany.com.au/buy-or-sell-a-business/20110811-video-game-industry-hit-as-thq-closes-two-australian-studios.html</p>
3	Creative Assembly	G	<p>The Creative Assembly http://www.creative-assembly.com.au</p>  <p>Primary product and or service: Game maker specialising in strategy war games.</p>	<p>Sega buys company in June 2011</p>
4	Pandemic	F	<p>Pandemic Studios http://www.pandemicstudios.com</p>  <p>Primary product and or service: creators of Destroy All Humans!™</p>	<p>Brisbane studio closed late 2009.</p>
5	*	K**	1	
Multimedia				
6	Ice Media	A	<p>Ice media http://www.icemediam.com.au</p>	

			 <p>Primary product and or service: Icemia is the largest website, multimedia and applications design and development company in Queensland and one of the largest in Australia.</p> <p>Employs: Marketing consultants, graphic designers, information architects, usability consultants, interaction designers, software engineers, copy writers and editors, web developers</p>	
7	Queensland Transport	D	2	
8	Queensland Museum	E	1	
9	*	C	1	
10	ABC Online News	I	<p>ABC Online- Brisbane http://www.abc.net.au/news</p> <p>Primary product and service: ABC Online has more than 1.7 million pages of content across 15 subject gateways, with additional services offered via WAP, SMS and i-mode mobile formats.</p>	
11	BCM	J	<p>BCM http://bcm.com.au, blogs.bcm.com.au, twitter.com/bcmpartnership</p> <p>Primary products and services: producing interactive media and other media formats</p> <p>Employs: 80 Specialist staff, based in both Sydney and Brisbane offices,</p>	

APPENDIX 8: CASE STUDY AND INTERVIEW PROTOCOLS

CASE STUDY PROTOCOL

The case study protocol contained the following items.

- An overview of the project (project objectives and case study issues).
- Field procedures (credentials and access to sites).
- Questions (specific questions that the investigator must keep in mind during data collection).
- Guide for the report (outline, format).
- Management of data and confidentiality.
- Digital encoding requirements.
- Examples of secondary sources of evidence.

INTERVIEW PROTOCOL

1. Prior interview

- a) A letter was sent via email to each participant prior to their scheduled interview. The letter provided an overview of the project and the consent form. Areas of concern such as permission to enter the site were mentioned, where agreement to the interview indicated approval for the

researcher to enter the workplace. This letter clearly indicated the researcher's credentials. Attached to the letter were the following.

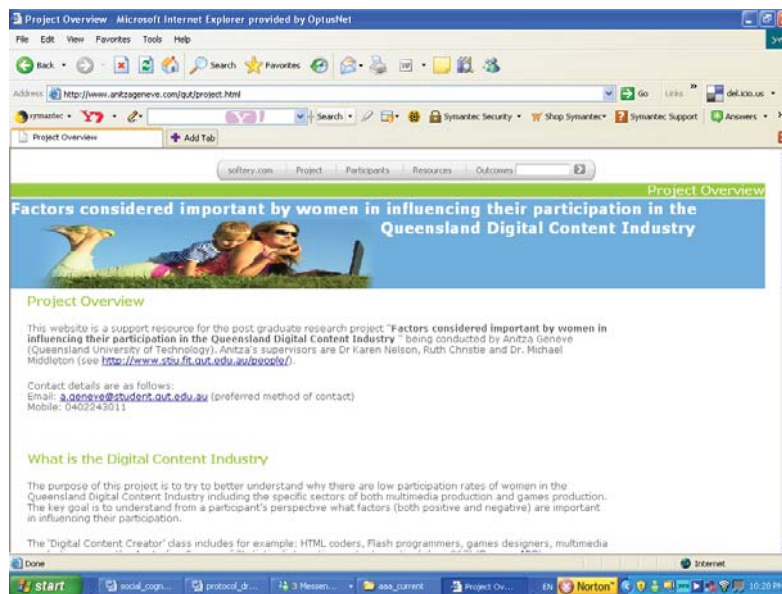
b) A link to a website with information for participants

<http://www.anitzageneve.com/qut/project.html>.

c) An attachment of the Australian Culture and Leisure Classifications (ALCL) 'Interactive Content Creation' class 267 (Australian Bureau of Statistics, 2008) definition. This is provided to potential interviewees so that they can confirm their suitability. Further clarification of eligibility occurs through a discussion with the interviewer.

d) Flyer (which could be forwarded to other possible participants for example, snowball sampling)

Item b) (below)



Item c) Extract outlining the Interactive Content Creator occupational role

The interactive content creation class (267) consists of units mainly engaged in the development, creation and production of interactive content for digital products and services. Interactive products are those for which the narrative is able to be controlled or influenced by consumer-participants.

Exclusions / References Units mainly engaged in;

(a) producing animated films are included in Class 263 Film and Video Production; and (b) developing commercial business application software, such as word processing and spreadsheet applications, are out of scope of the classification.

Primary Activities

Interactive content design and development

Interactive film production or post-production

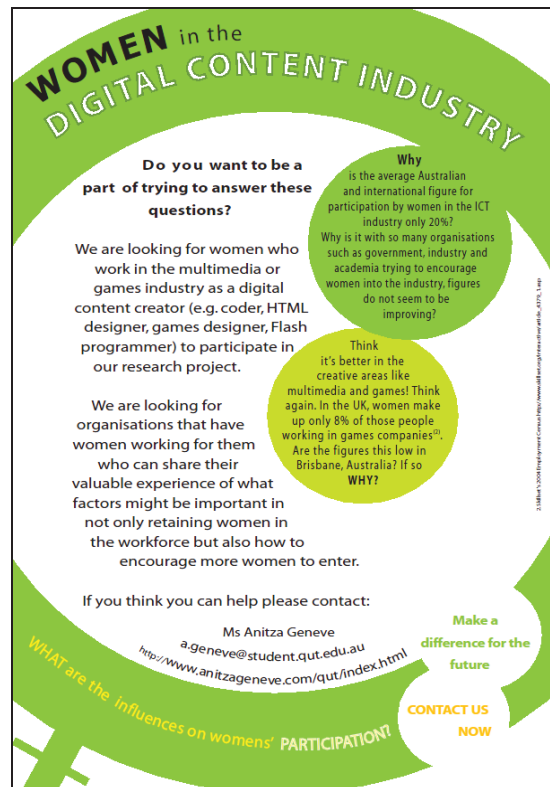
Interactive games design and development service

Production or post-production of multipath films and other interactive style films

Web site design and development service

Source: ABS (2008, pp. 49)

Item d) (below)



2. Interview protocols:

Interview stage	Requirement
Prior to interview	Email an overview of the research project, their requirements as participants and the pre-interview questionnaire (see Appendix 8 for online questionnaire)
	Advise employer if required of onsite visitation, include overview and credentials
	Email participants a reminder for the time, date and location
At interview	Confirmation that informants occupational role is suitable for the sampling strategy
	Interviewee advised of time schedule- 45mins
	Explanation of confidential and non identifying information
	Awareness of reflexivity - interviewee expresses what interviewer wants to hear
	Reiteration of purpose, researcher's credentials, timing
	Style of interview is personal and unbiased
	Self-disclosure -should be avoided if it seems like it's leading to interviewer bias
	Broad initial question: I'm interested in knowing your thoughts on what influences there might be on women's participation in the Digital Content Industry. If the participant did not respond or required clarification this question was reposed as. Tell me about your experiences in the industry, how did you get here? What have been the influences?
	A list of probes in instrument General probes: probes non-leading but not necessarily dispassionate. For example, "Really (to show interest), can you tell me more about

	<p>that? Why do you think that was (in reference to described scenario)".</p> <p>Specific 'participant' prompts: Used only when the interviewee raised a related point. For example, "I'm not sure I understand, did you mean x, y, z (very accurate rephrase) with link to research aspect".</p> <p>Relational prompts: As the researcher could readily be identified 'as one of the participants for example, women working in industry, reference could be made to the researchers own experiences.</p> <p>Likewise, researcher had a child so could draw on that experience to connect with participants.</p> <p>Focusing/investigative prompts: when a researcher felt that something has been touched on or hidden in the participant's prior comments. For example; "I'd like to come back to something you mentioned earlier..."(see question bank)</p>
Following interview	Digitise footage as soon after the interview as possible.
	Ensure that the transcript does not identify the participant
	Store interview transcript in a secure and safe manner.
	Following the interviews participants will be provided with a transcript of the interview via email.
Field notes/ observations	These were recorded on paper and entered into the case study database (Nvivo project) as soon after the observation, where possible observations were memo's linked to particular participant interviews.

3. Management of data and confidentiality

- Pseudonyms were used for data arising from questionnaires and interviews
- Questionnaire and interview transcripts were not tidied up, as recommended by Corden and Sainsbury (2006); consequently spelling errors in the questionnaire and use of colloquialisms remain intact.
- Digital encoding requirements. Interview data was recorded on video, which potentially has a higher risk of the participant being recognised. Video was viewed only by the researcher (that is excluding supervisors). Recordings in Phase 2 were outsourced for transcriptions. In this instance all video was converted to audio before being submitted to the transcription provider. Naming of files to be transcribed by third party service
participant number_industry sector_phase
for example, 2. games_phase 1 is the second participant from the games industry
 - In regards to storage and disposal, recorded video was encoded to DVD and password protected and these were kept in a locked storage cabinet only accessible to the researcher.

4. Ethics.

- As this research involved the active participation of human subjects for example, questionnaires and interviews, it required ethical approval to meet standards of the Queensland University of Technology policy and Commonwealth and State regulations / legislation. In accordance with institute policy, documents included a participant information sheet, written consent from participant and ensuring anonymity of participant.

APPENDIX 9: ONLINE QUESTIONNAIRE

The following questionnaire was administered using survey monkey. Completed questionnaires were sent to the researchers email account.

- Name: Age:
- Gender:
- Current role and organisation:
- Your average workload per week is:
- Length of time in role:
- Length of time at current organisation:
- Previous work: type of organisation and description of job:
- Length of time in Digital Content Industry:
- Number of employees in your current organisation: Males: Females:
- What are you qualifications and the year completed:
- How would you describe your current position in terms of quality of experience (for example, fun, exciting, fulfilling, repetitive, and boring)?
- Describe the types of activities you typically do in your job? for example, program, design, manage people, data entry
- Do you believe there are factors that are barriers for women to participate in the Digital Content Industries? Answer values range from 1 (strongly disagree) to 6 (strongly agree):
- Working in your current position or similar what factors have you personally experienced that have been a negative influence on your career/participation? Please list or describe the factors:
- Based on previous experience within your industry what percentage of males and females do you think occupy the following roles?:
 - a)Junior programmer b)Senior programmer c)3D modeller d)HTML coder
 - e)Graphic designer f)Other (project managers) g)Other (please type)

The following question is about your exposure to certain media and resources. Where did/do you source your information about employment prospects?

- a)Online b)Recruitment agents c)Verbal- peers, network d)Work

Where do you source your information about the industry? Examples include:

- a) Magazines- industry specific b)Newspaper c)Online web sites d) Blogs
- e) Industry events f) Training events g) Exhibitions

APPENDIX 10: EXAMPLES OF INTERVIEW QUESTION BANK

Part A- Past

Question	Prompts/Possible responses	Literature
Can you tell me the story of how you started in the industry?	Prompts: Did your experience of computers at school influence your occupational choice? Did someone you know provide an interest or opportunity? For example, spouse. Possible Answers: role models for example, parents, partner	Wisenet and CQU survey asks these questions and nearly a third of the women interviewed went into industry not because they were recruited into it, but because they felt unwelcome in academia (CEN Report, 2001 http://pubs.acs.org/cen/employment/7927/7927employment.html)
Do you recall whether you thought there were going to be barriers when you started in the DCI?		
Did you have a clear idea of what you wanted to do when you entered the industry?		
Why did you enter the industry?	For example, Financial, Travel, Flexible work hours, Challenge- changing technology	Pantelli (1999) asks this question in UK and finds 'want a challenge'
What was your previous role/organization and what were your reasons for leaving your previous employer?		

Part B- Present

What do you enjoy about your current role?		
How confident are you in your role?		McGrath-Cohoon and Aspray (2006) suggests confidence may influence women to leave the IT profession
In your pre-interview response you mentioned you had experienced certain factors such as ... tell me more about how you responded to these.		
If you have experienced x negative factor why do you continue to participate?		
Have you ever considered leaving the industry due to concerns about employment options? Why?	Pay inequity prompt, contract versus fulltime	
Why do you stay in the industry?	For example, find it interesting- what aspects. Don't know what else to do? Trying to leave- why?	

Part C Media

Where did/do you source your information about employment prospects?	For example, Newspaper Online Verbal- peers, family, university, work	
Where do you source your information about the industry?	For example, Magazines industry specific Magazines women's interests, Newspaper, Online, Blogs, Industry events, Training events	Such documents may be used as multiple sources of evidence for case study (Yin, 1995).

Part D: Revisit research questions

	In your response you said you had experienced an event that you would consider a negative influence on your career? Can you tell me more about this event.	The event was _____	
	Do factors exist for women in the industry? Please indicate if you have experienced these personally.		
	Do you think there are specific factors that can influence women in ICT-DCI compared to other industries?		Women see themselves as different to other women (Cukier, Shortt and Devine, 2002, Betz and Hackett (1997)

Part C- Future

	What long term goals do you have?	For example, personal goals (choice content and performance)	
	Do you think you will face barriers in the future?		SCCT (Lent et al., 1994) - outcome expectations
	How committed are you in staying in the ICT industry?		
	How would you describe your ideal position?		
	Do you think you have the appropriate skills to achieve this?		
	Do you know of any support options that are available to encourage women to participate in ICT related industries?	For example, WIT Office for Women	ST (Giddens, 1984) suggests allocative resources may be an influence on agency.

APPENDIX 11: HERMENEUTIC PRINCIPLES APPLIED IN THE RESEARCH

How the research process addresses the principles proposed by Klein and Myers (1999).

Principles	Its methodological emphasis	Implemented in the current study
1. Hermeneutic tradition	Explain the nature of socially constructed human meanings and the interdependent meaning of the parts and the whole that they form	This principle is achieved by iterating between considering the shared meaning of the parts (influences, interactions) to the whole (the participation). The aim of understanding the deeper aspects of participants accounts/
2. Contextualisation	There a need to explain the socio-historical context and how this context has evolved to its current state	The context of the study identifies; - the DCI, in specific the multimedia and games industry in Queensland - the historical context of gender and social equity issues
3. Interaction between researcher & subjects	Explain the mutual interactions of the researchers with the participants.	A high level of reflexivity is a goal of the research and this includes a clear articulation of the researchers experience in the industry sectors and personal motivations. A reflexivity log/diary is maintained.
4. Abstraction & generalisation	Explain how insights are derived through the use of a particular theoretical perspective acting as a sensitising device to view the world in a certain way	Clear description of the perspective to be applied to the research problem including the Critical Realist philosophy, and also the theoretical scaffold comprised of agency theories.
5. Dialogical reasoning	Explain possible contradictions between the theoretical preconceptions and the data gathered, allowing for a subsequent cycle of revision	The use of multiple theories as an intellectual basis of the research is made explicit.
6. Multiple interpretations	Explain possible variations in participant's interpretations.	The Individual Differences Theory expects there to be variation in narratives of experience. However, the goal is to also look for any key commonalities. Collecting a range of data from various sources and the use of multiple theories for interpretation also lends itself to multiple interpretations. The use of several theories, which offer different perspectives, also encourages a range of possible explanations.
7. Suspicion	Explain possible bias in narratives collected from the participants and in finding alternative explanations to the problem under investigation.	Examine the views and actions of participants and not of the researcher. Use of rival and multiple theories. High level of researcher reflexivity.

APPENDIX 12: GIDDENS' MODEL OF INTERACTION (BASED ON GIDDENS, 1984)

Structure	Signification	Domination	Legitimation
Modality	Interpretive scheme	Facility	Norm
Interaction	Communication	Power	Sanction
Key objects	signification or meaning making (interpretive schemes used in the communication of meaning)	power and control (facilities used in the exercise of power relations)	regulation and sanction (norms applied to the sanction of social behaviour)
Description	Agents draw on structures of "signification" (language and other symbolic codes) to produce/reproduce "communication" (meaningful and understandable interactions) via the modality of "interpretive scheme" (stocks of knowledge).	Persons exercise "power" by accessing "domination" structures, for example, allocative (control of materials like money) or authoritative (control of people) through the modality of "facility". Power is not fixed but a capability.	Agents "sanction" each other by drawing on "legitimation" structures (moral beliefs) via the "norm" modality

APPENDIX 13: SEARCH STRATEGY DETAILS

The choice of studies to include in the early literature review was driven by the following three key reasons.

- The study provides a general insight into the DCI and ICT context,
- The study identifies influences on participation explicitly relevant to women
- The study include an empirical element (where the cohort is women working in the ICT or DCI industry) or a conceptual element (offering a theoretical perspective).

The articles in the review were initially sourced from top ranking journals as identified in Table 61. For example, Ulrich's indicates if a journal is peer reviewed and QUT library resources (http://www.library.qut.edu.au/subjectpath/citation_indexes.jsp) provides general links to citation indexes. Journal articles were also referenced from Web of Science, which uses a citation index (Institute for Scientific Information ISI) citation. This provides some guarantee of the quality of papers, compared to general web-based search engines. Similarly, the Journal Citation Reports (JCR) provides an indication of the 'impact factor' of journals; however, this was not available for the entire range of publications. Consulting the references list of these articles allowed for a snowball approach to identify further articles. Searches within key databases included keyword searches for "Gender, Gender and ICT, Gender and IT, new media" and Boolean searches combining these.

Table 59 Example of key databases consulted for literature review

Type	Specific reference
Online journal database	IEEE Xplore
	Proquest(ABI/INFORM)
	Web of Science
	ABI/Inform
	ScienceDirect
	ACM (Digital Lib)
	JSTOR
Government reports	NSF (USA), DCITA (Australia)

Each document used in the review was stored within an NVivo project as either a full text version of an article or a proxy document. A casebook was created to enable the following attributes to be coded for each document (Table 62). Each case was coded into the nodes identified in the table.

Table 60 Research design attributes identified in the meta analysis of key literature.

Node title	Attributes
Source	Example include journal, conference, book
Research type	Conceptual, empirical
Epistemology	Interpretive, Positivist, Critical
Methodology	Case study, Interview, Survey
Type	Primarily explanatory, exploratory or descriptive, conceptual or empirical
Country of study	USA, UK
Context	Domain the research purports to, industry field
Cohort	If empirical study-cohort sampled
Source	Name of Journal
Source type	Journal, conference, book or other
Year	
Author	
Influences	

APPENDIX 14: EXAMPLE OF RESEARCHER REFLECTION

A reflexive approach can be applied to interviews (Silverman, 2009). Although the interviewer aimed for a consistent interview style, upon reflection it was noted that interviews had a different feel to them. Sometimes this was due to the personality of the interviewee, others it had to do with the environment for example, cold, rainy day. There was a concern by the researcher that these factors may influence the types of questions being asked. Upon further reflection, the researcher can see the different types of questions asked were consistent and appropriate. As Table 63 indicates, the questions in the interview included the different types recommended by Strauss, Schatzmann, Bucher, Ehrlich and Sabshin, (1964).

Table 61 Types of interviews questions (based on Strauss et al., 1964, pp, 26 – 27)

Type of question (based on Strauss)	Example in the reported research
The challenge or devil's advocate question	A participant stated there were no barriers to women's participation. The researcher then asked, "why then are there only two women out 50 employed in your organization?"
The hypothetical question	The researcher asked "If you had to give advice to a young girl what would you describe as the positive aspects and the negative aspects of working in the industry"
Posing the ideal	The researcher asked, "What could we do to encourage more women into the industry?"
Offering interpretations or testing propositions	The researcher asked, "So are you saying that you lacked confidence?"

Researcher's memos -Following are two examples of the researcher's memos.

June 2007 I've just finished coding the first 12 interviews in NVivo. There are over 150 nodes or possible 'influences'! The only theme that stands out is that of lifespan. I'm now going to sort them into the E the P and the dash categories. The environment seems easy, as it's mostly descriptive of structures such as settings, the P seems harder but it is seems to involve labels surrounding identity.

October 2008 I realised today there was a tension between the gendered identity and the occupational one. I had been so focused on seeing their experiences as 'women' that it took a while to 'hear' the data. I reflected that there had been a distinct pulling away from a gendered identity when I first contacted them/meet them. I had to sell the study to them as a study of 'industry professionals' rather than women. I have been describing the individual as a gendered but that's the problem! When we see a female DCI worker we see the female and not the DCI.

March 2009 – spent some time thinking about how I collected the data.

Interviewer as native- It appeared to the researcher that as participants perceived her to be one of them (a member of the DCI community and also a female) that this facilitated access to participants and an open sharing of personal information during the interviews. However, one early interview highlighted to the researcher the need for neutrality in positioning the research to participants. During the interview, the researcher noted an initial standoffishness by the participant, indicated in most by the participant's negative body language and coyness in responding. This was in contrast to previous interviews, where the researcher had readily established a rapport with interviewees. Over the course of the interview, the interviewee appeared to relax, even commenting at the end how enjoyable it had been. When the researcher enquired for the reason of the initial awkwardness, the interviewee replied in a somewhat relieved fashion that she had thought the

researcher was a “feminist”. This led to the researcher’s reflection on how participants perceive gender studies.

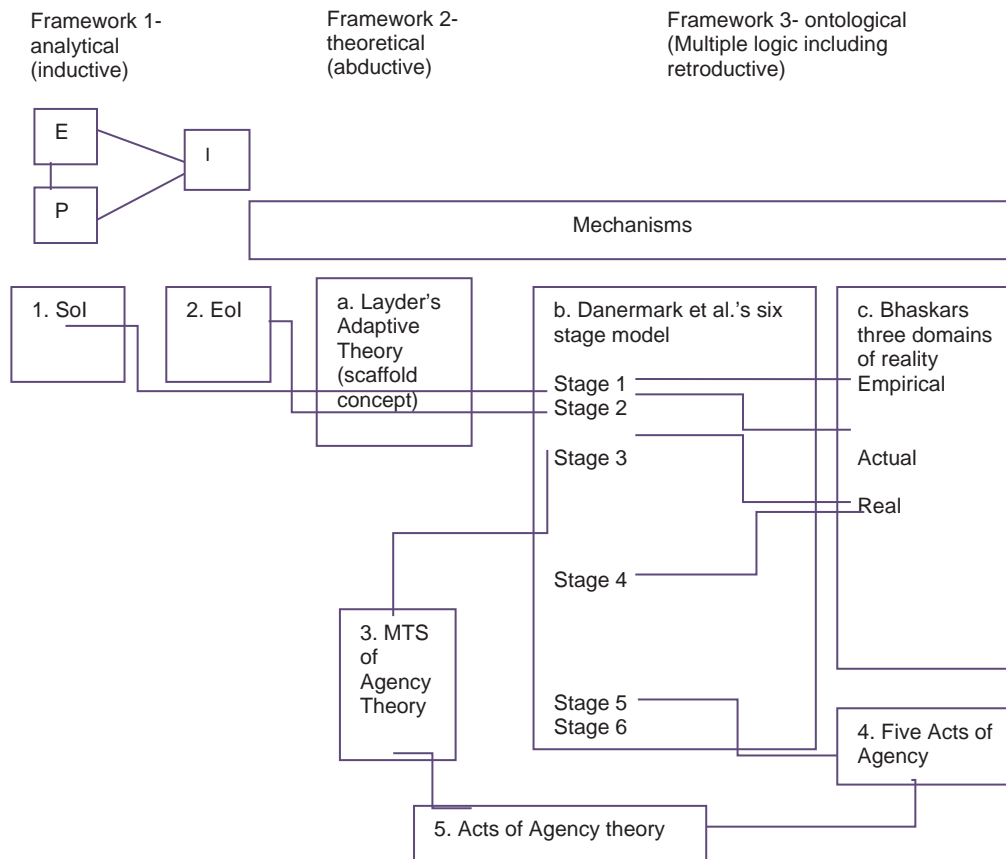
Secondary data sources- Secondary sources were chosen because they were mentioned by participants. For example, a participant mentioned a website Gamasutra and this site was then treated as data and analysed. The exploratory approach to secondary sources of data led to several ‘unplanned’ sources of data. One interesting scenario arose when the researcher attended the Game On: Wired Women event (Item 49) and expected that an audio transcript would be made available of this event; however, this did not occur. Few field notes had been recorded in light of the planned recording. Following up this event in the online environment led to the identification of a website blog discussing the event. This blog was then treated as a secondary data source. Another example emerges from the comments participants made towards the gendered nature of games products. This then led to the researcher analysing the types of games products available. Other key secondary sources of data included over 1000 raw comments from an international survey of game professionals (see IGDA, 2005a, b), several were from Australian respondents. Hence, as Layder (1989) recommends there was certain flexibility towards the collection of multiple sources of data. This was seen as a fruitful and beneficial approach.

APPENDIX 15: METHODS OF DATA REPRESENTATION USED IN THE CURRENT STUDY

Table 62 Approaches to data representation implemented in the study

Representation method	As implemented in the study
Graphic (see Larkin and Simon, 1987; Bauer, 1993) and Integrative diagrams (Strauss, 1987) Visual model (Creswell and Brown, 1992)	Findings conceptualised in several different formats including matrixs, tables and illustrations.
Conceptual Framework (Miles and Huberman, 1994, pp. 18-22)	Models such as the <i>Sphere of Influence</i> organise data.
Matrix (Miles and Huberman, 1994)	Early on in the data process, a matrix of influences encountered by participants was developed. Ordered matrix’s based on data categories were more useful than unordered matrix’s.
	The ‘Acts of Agency’ are presented in a tabular form with participant’s comments to illustrate these constructs.
Conditional matrix (Strauss and Corbin 1990, pp. 255-256).	Matrix listing the environmental characteristics or conditions (see Table 36).
Time displays (Miles & Huberman, 1994, p. 91)	Lifespan concept within the <i>Sphere of Influence</i> (see Table 42). Used as a descriptive organising device for rendering a sequence of events more comprehensible.
Typology (Patton, 2002)	The <i>MTS</i> typology of theories involves the categorisation of theories based on their level of abstraction.

Following are several examples of early data representation that occurred during research



Existing research informing the process

- a) Layder
Adaptive Theory offers an extensive argument for using theory as a scaffold, congruent with Critical Realism
- b) Danermark et al.
Offer a specific methodological approach for data analysis, congruent with a Critical Realism
- c) Bhaskar
As the key theorist for Critical Realism offers 'three domains of reality'

Models emerging from the research process

1. Sol- Sphere of Influence

Sensitises researcher to characteristics of the environment (E) and person(P)

Eol - Events of Interaction

Sensitises researcher to specific events of interaction (between E and P)

MTS- Multi-Theory Scaffold

Guides choice of existing agency theories used to stimulate researcher's insights into underlying mechanisms

Five Acts of Agency

Identifies agent-driven mechanisms involved in the interaction between E and P

Acts of Agency theory

Example of unordered matrix used during data analysis

Influence	Phase 1 Participant ID											
	m1	m2	3	4	5	6	7	8	9	10	11	12
Social agents	x	x			x	x			x	x	x	
Access to resources			x			x		x			x	
Role models				x	x		x		x			x

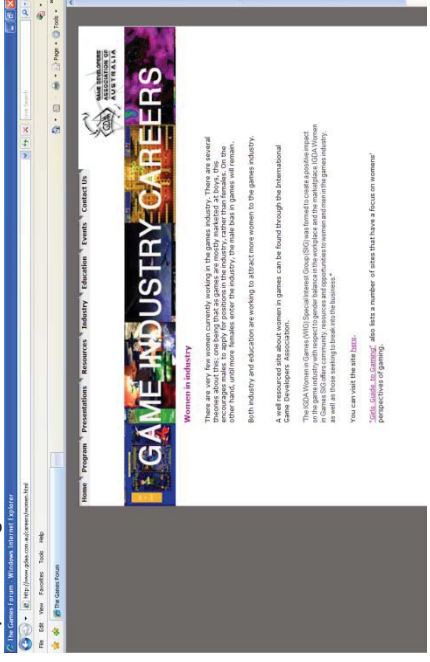
APPENDIX 16: REFLECTION ON THE APPLICATION OF GIDDENS' STRUCTURATION THEORY (ST)

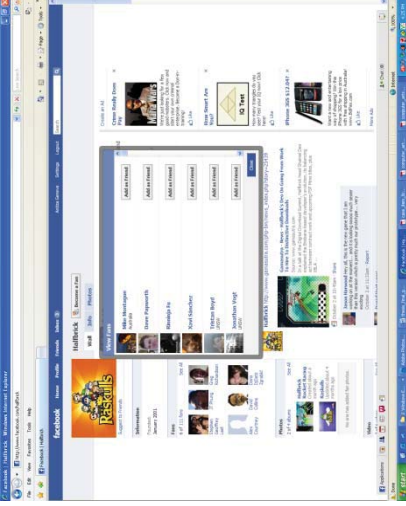

Table 63 Application of Giddens' *ST* (Giddens, 1984, pp.281-28) and Shoib et al.'s (2006) recommendations towards applying Giddens *ST*

Giddens' recommendation		As implemented in this investigation
1	All human beings are knowledgeable agents	Informs epistemological approach, suggesting the appropriateness of hermeneutic analysis
2	The knowledgeability of human agents is always bounded on the one hand by the unconscious and on the other by the unacknowledged	Recognises the limitations of participants subjective insights
3	The study of day-to-day life is integral to the analysis of the reproduction of institutionalised practices	Informs epistemological approach with a focus on everyday lived experience
4	Routine, psychologically linked to the minimising of unconscious sources of anxiety, is the predominant form of day to-day social activity	Similar to Bandura and Beck with anxiety and risk minimization strategies by the agent
5	The study of context, or of the contextualisation of interaction, is inherent in the investigation of social reproduction	Case study identifies a context and the unit of analysis is the everyday social practices inherent in the interaction between agents and their environment
6	Social identities, and the position-practice relations associated with them, are 'markers' in the virtual time-space of structure	This highlights the importance of identity as a marker.
7	No unitary meaning can be given to constraint in social analysis	The constraint of an influence is in the eye of the beholder
8	Among the properties of social systems, structural properties are particularly important, since they specify overall types of society	Sensitizes the researcher to this level of analysis
9	The study of power cannot be regarded as a second-order consideration in the social sciences	This sensitizes the researcher to the concept of power as a possible underlying mechanism
10	There is no mechanism of social organisation or social reproduction identified by social analysis which lay actors cannot also get to know about and actively incorporate into what they do	Participants may have some knowledge of the underlying mechanism
Shoib's recommendation		As implemented in this investigation
1	Sensitivity towards the context properties of systems	Clear definition of the study's context
2	Time insights into the immediate environment and past experience of the social actors; and the broader social and longer-term historical setting.	Acknowledge history of both longer duree of society and individual histories
3	Examples of the ongoing production and reproduction of practices through social routines and un-stated cultural norms	Level of analysis may consider social practices.
4	Aspiration to overcome the division between macro and micro analysis	Level of analysis must consider both macro and micro aspects.
5	Complexity of human intentionality, deliberate actions	Agents are not passive, therefore they must do something, and they must act.
6	Subtlety of structural constraint	May consider subtle or hidden influences.

APPENDIX 17: SECONDARY SOURCES OF DATA


Following is a list and description of all the secondary sources data used during data analysis and further theorisation. The last column, 'PDF' indicates if a PDF of the data is included in this dissertation.

No.	Title	Description	Date	Industry	Key Purpose for inclusion	PDF attached
Item 1	Inquiry into pay equity and associated issues related to increasing female participation in the workforce	162 submissions to the Australian House Standing Committee on Employment and Workplace Relations, Committee	2008	Wide range	A wide range of other industries, where women's pay equity has been raised as a concern. There is a notable lack of submissions from the Australian DCI. http://www.apf.gov.au/house/committee/ewr/payequity/	N
Item 2	International Games Development Association (IGDA) website	Greater Brisbane Chapter of International organisation website	2009	Games	Provides background to international games industry context. Highlights types of industry events being promoted to those people interested in the games industry, including the 2009 'GameOn' series of public lectures. Links to other websites of interest. Indication of organisations in Australia. http://www.igda.org/	N
Item 3	Game Developers' Association of Australia (GDAA) website	Australian based games developer organisation	2009	Games	Provides background to Australian games industry context. http://www.gdaa.com.au/ 	N
Item 4	Australian Interactive Media Industry Association (AIMIA)	State Chapter presidents 2009	2009	Multimedia	http://www.gdaa.com.au/careers/women.html Provides background to Australian multimedia industry context. Australian Interactive Media Industry Association (AIMIA) website (screenshot 16 th Oct 2009).	N

					committee. Not a measure but an insight how the industry image remains "masculine" simply due to the ratio. http://www.aimia.com.au/i-cms?page=1		
Item 5	Games company on Facebook	Halfbrick Facebook page	2009	Games	 http://www.facebook.com/halfbrick Screenshot 18 th Oct 2009	N	
Item 6	GDAA website/ Government sites advising on careers	Special Section on careers and women sponsored by Knowledge Skills Victoria	2009	Games	<p>Front page identifies content as including "discussions about women in the industry". Identifies the presenters of the 2004 GDAA conference. Male majority, of the female's one is a politician and another, the Chair.</p> <p>Describes the IGDA website as a "well resourced site", however links suggest otherwise where the link to a "girls guide to gaming" is essentially a PDF of outdated links (for example, to 2004 stories/news) and other websites (see item 9)</p> <p>http://www.gdaa.com.au/careers/index.html http://www.gdaa.com.au/careers/women.html</p>	N	
Item 7	E3 website	Images of Booth babes	3/2009	Games	 http://www.e3girls.com/	N	

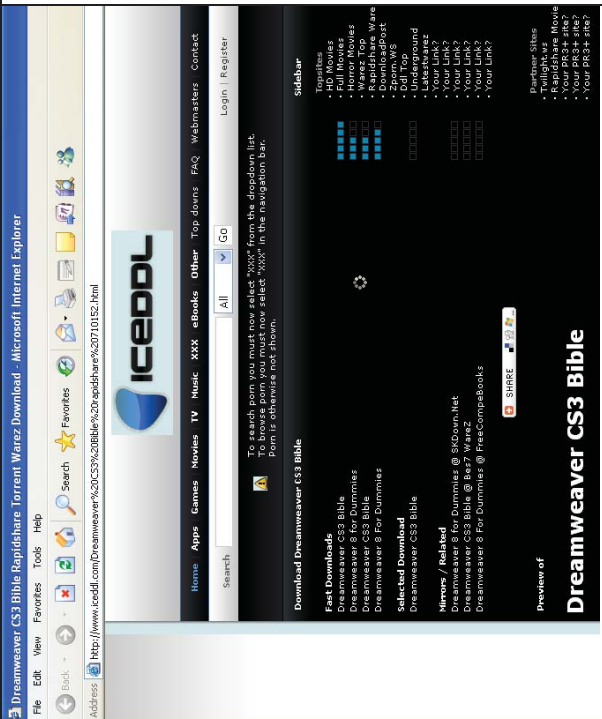

Item 8	Girls Guide to Gaming	A PDF document with links to websites with a short review of the site.	3/2009	Games	Makes reference to the site not being "girly". States that it aims to dispel myths that the industry "is run by geeks". Provides resources for "children". http://www.gdaa.com.au/teachers-forum/Documents/Girls_Guide_To_Gaming.pdf	Y
Item 9	IGDA Women in Games SIG website	Online article	3/2009	Games	Headline articles such as "why it is critical more women than ever play and develop games", "why we need more women". Well emphasised links to social networking sites such as LinkedIn, for "occasional job postings". http://www.igda.org/women/resources.html	Y
Item 10	EDGE online magazine (by line: The Global Games Industry Network)	Article on Jade Raymon (Ubisoft) Article "why we need more women in games"	3/2009	Games	Article reports on a female role model in the games industry. Comments responding to the article range from disparaging to supportive. Reports on a GDC panel who suggested that "women don't always recognise or even have confidence in the ability to be games designers". http://www.next-gen.biz/news/jade-raymond-to-manage-ubisoft-toronto	Y
Item 11	GameDev.net website	Article title "Play games to work smarter: why it is more critical than ever that women and play and develop games"	4/2009	Games	Reporting on the IGDA Women in Games SIG refers to cyber-socialisation, serious games in areas where women are dominate for example, healthcare, "obstacles exist" when "young women come in, they often sit in the back and think that they don't belong" These young women cannot "imagine themselves as games designers". http://www.gamedev.net/columns/events/gdc2009/article.asp?id=1764	Y

Item 12	The Glasshammer website		Article "what am I worth"	3/2009	ICT	Personal account of a woman receiving 'constraining' feedback and an agentic response. http://www.theglasshammer.com/news/2008/10/22/what-am-i-worth/	Y			
Item 13	EDGE online magazine (by line: The		Article title "Microsoft recognises games	3/2009	Games	Reports on the "first ever Women in Gaming Awards" luncheon, as being "an intimate event".	Y			

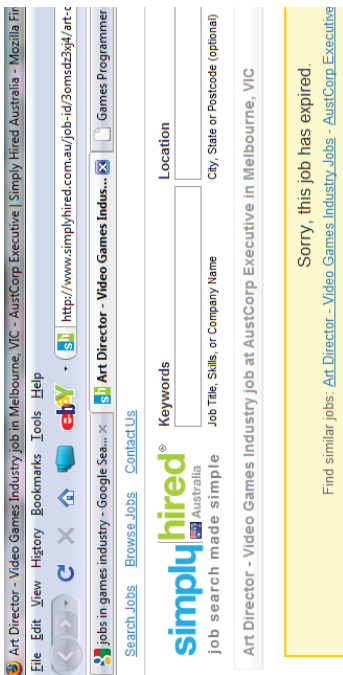
	Global Games Industry Network)	industry women" Article title "GDC: We need more women in games"				http://www.edge-online.com/news/microsoft-recognizes-game-industry-women	
Item 14	Promotional material for games company	Pandemic promotional leaflet distributed at AGDA 2006 conference	2008	Games		Describes the studio environment as being an eclectic mix of colleagues and friends who share interest such as partying, surfing, camping to gaming and poker.	Y
Item 15	Pink Collar report	Government whitepaper	2007	Technology		Describes one initiative in the education sector, the "Diploma of Multimedia for Women" program. This same program in the early years charged the female participants an extra \$500 (in comparison to the non women's Diploma) for the guest 'role model'. One interview participant went through this program and described her experiences.	N- difficulty in finding a copy, contacted author Sonja Bernhardt
Item 16	Screen Goddess calendar	Calendar and blogs commenting on calendar	2005	ICT		A calendar where the sexualised images of female IT professionals caused controversy. http://www.itgoddess.info/ Further resource includes a blog responding to the calendar, which notes the withdrawal of funding from the Australian Computer Society. http://rosemary.id.au/view/blog/hullabaloo/ Blogs: MashUp / Cheesecake calendars Archives Helen July 12, 2006 05:24 PM The Sydney Morning Herald http://blogs.smh.com.au/mashup/archives/your_say/005178.html	Y
Item 17	Women in IT UK email newsletters	Email from industry group for women	2008-2009	ICT		Email asks "do you lack confidence".	Y

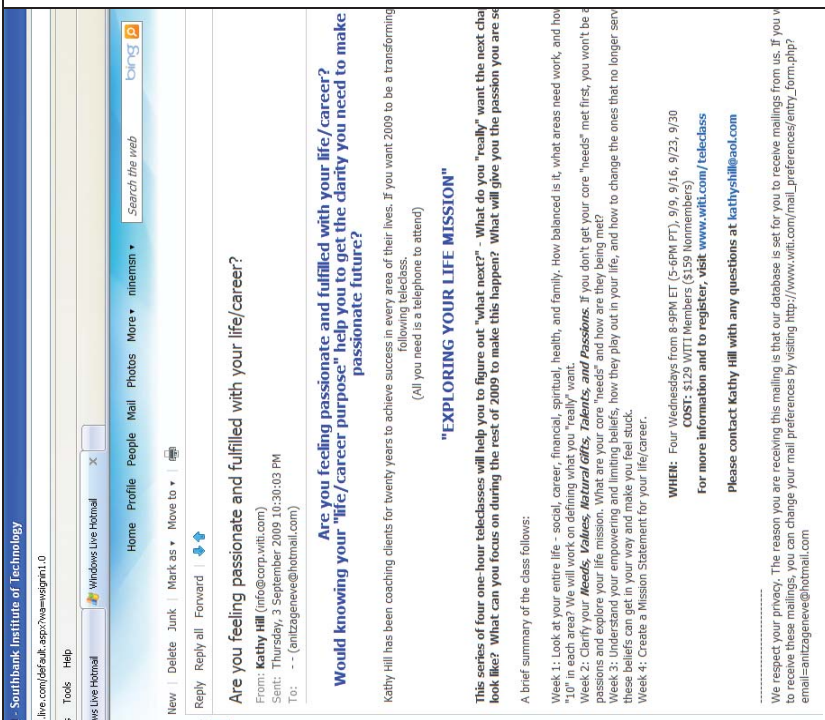
Item 18	Women in Games in Australia website	A website promoting women in games.	2008-2009	Games	Little activity is evident on this website. http://www.womeningames.org.au/educators.htm	Y
Item 19	Desktop magazine	Australian Design: Australian Culture magazine issue 250 June 09	2009	Multimedia	Competition features an illustration of a semi-clad woman on fire. Competition is supported by several education and industry groups for example, QaNTM, Wacom, Semi-permanent conference. 	Y
Item 20	Google search	Search term "warez download dreamweaver"	2009	Multimedia	Googling a search term that a typical user looking for free software may use. The fifth search return led to a website that offers several links in the navigation bar to software, ebooks and then live sex. One website has a markedly feminine look to it, which contrasts the majority that are seemingly targeted towards men.	N

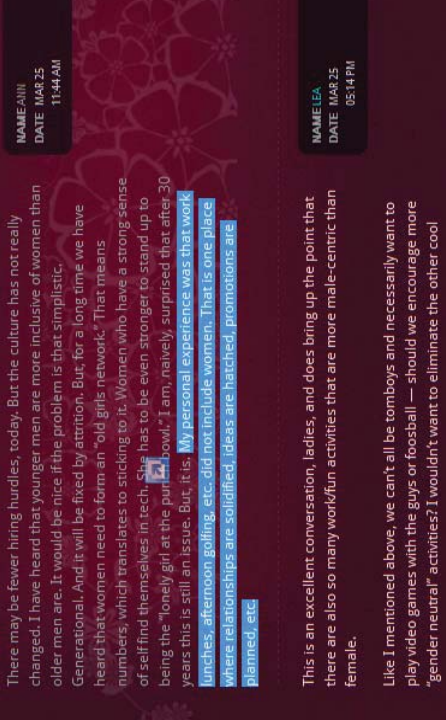
--	--	--	--	--	--


					 <p>The fifth search led to a website that offers several links in the navigation bar to software, ebooks and then xxx and live sex</p>	
Item 21	Job advertisements	LinkedIn job advertisement	2008	Multimedia/ Games	<p>  To search porn you must now select "XXX" from the dropdown list. To browse porn you must now select "XXX" in the navigation bar. Porn is otherwise not shown. </p> <p>Several job advertisements feature the word "passionate" as a characteristic of the DCI worker.</p> <p>Slant Six Games is a videogame development studio that specializes in creating games for Sony PlayStation Portable and Sony PlayStation3 next generation console. Located just steps from Granville Island in beautiful Vancouver, British Columbia, we are a highly experienced team of professionals with the opportunity to practice the art of video game development in a non-corporate office. We are passionate about creating games the way they should be made — using creative drive, strong work ethics, efficient teamwork and above all, a sense of fun.</p> <p>Slant Six Games currently has an opportunity for a passionate Tools/Application Software Engineer to join our team.</p> <p>The Tools/Application Software Engineer works closely with our existing production team to write and debug leading-edge proprietary toolsets and applications for front end or gameplay.</p>	Y

Item 22	Blog	Ashley Jenkins pro-gamer	3/2009	Games	Female games pro-gamer personal blog makes the statement that she looks "forward to when gender is no longer an issue". http://www.news.com.au/link-no-longer-available	Y
Item 23	Website featuring female role model in the games industry	Website	2009	Games	Gamasutra website and Edge online magazine rank the top role models in the games industry. http://www.edge-online.com http://www.edge-online.com/features/game-industrys-100-most-influential-women?page	Y
Item 24	Google search	Search term 'jobs in the games industry'	16/8/2009	Games	Google search 'jobs in the games industry' limited to Australia search data. Search returns a predominance of design positions. Links to jobs advertisements specifying passionate people. August 16th 2009 2nd Google item linked to the following website http://www.jobs.com.au/gaming-industry-jobs/ Suggest industry requires passionate and creative individuals.	N
AUSTRALIA'S GAMING INDUSTRY JOBS Gaming industry jobs in Australia require highly creative, innovative, and passionate individuals. This type of profession may stray from the typical 9-5 desk job, but this doesn't mean that one can slack off and simply just "play." This industry focuses on the development of entertaining video and computer games for a wide range of consumers. The common notion that comes with this profession is that it's meant for the members of the younger generation. This isn't true at all. In fact this industry requires the most advanced programmers, the best writers and graphic designers, and the most patient testers. Age is not a factor in this field. If you are truly interested in the creation of video and computer games, then you'd might like to consider selecting one of the many gaming industry jobs in Australia. There's truly something for everyone in this field, and you must have the drive to create something unique for gamers to enjoy.						
					6th Google search result http://www.simplyhired.com.au/job-id/3omsdz3xj4/art-director-jobs/	

						
Item 25	WomenGamers.Com -	Article in Online Gaming Magazine 'Gaming Magazine Ads: Failing the Female Market'.	3/2010	Games	<p>the position will provide 'mentorship, coaching and performance management of lead artists on a game team as well as team members in collaboration with the Lead artists'</p> <p>Blogger discusses the low levels of women readers of games magazines and attributes this to the images (advertising) of women in the magazines.</p> <p>http://www.womengamers.com/articles/editorials/gaming-magazine-ads-failing-female-market/</p> <p>Review by womengamers.com on games magazine ads.</p> <p>Highlights the stereotypical and sexist portrayal of women and girls in the advertisements.</p>	Y
Item 26	WITI (organisation aiming to support women in IT careers)	Email promoting training opportunities	9/2009	ICT	Training targeted towards women in the IT industries. Highlights key words of 'passion'.	N

						
Item 27	Eweek magazine	Article in online magazine	2008	IT	Online article discussing wage gap for women in IT http://www.eweeek.com/c/a/IT-Management/Wage-Gap-Narrower-for-Women-in-IT/	N
Item 28	IGDA	Diversity Report	2006	Games	Provides 1000+ unedited comments from the survey. http://www.igda.org/diversity/IGDA_Comments-on-Diversity_Jul05.pdf	Y

Item 29	Gamasutra website	Times series of front page	2009 (archive 2001-2008)	Games	Historical time series of a key games industry website. Time series involved a screen capture in the first or second month of each year from 2002-2008. In 2002, the webpage includes an image labelled 'negotiating contracts'. It is a retro black and white photograph featuring only men at the negotiating table. Distinct lack of female presence in authors, contributors, reviewers. Graphics targeting men. Job ads seeking 'skilled and passionate' people. By 2008 the side bar features older women at a games event. http://web.archive.org/web/20010108104100/http://www.gamasutra.com/	Y-see next table
Item 30	ComputerArts	Magazine (Print)	2010	Multimedia	Key industry magazine. UK based but has an Australian publication. Several articles illustrate a male ratio for example, of the featured creative's one of nine is a woman, the article 'how do you make a good brand great' has six authors(all male), six judges of a design competition (all male).	Y
Item 31	Blog			Technology	<p>Blog where several women are discussing why there aren't more women in technical roles. Points out that there are no 'barriers' but rather women feel left out. http://www.lealea.net/blog/comments/women-in-tech-asking-the-wrong-questions/#xzz0cRIJSEsg</p> 	Y

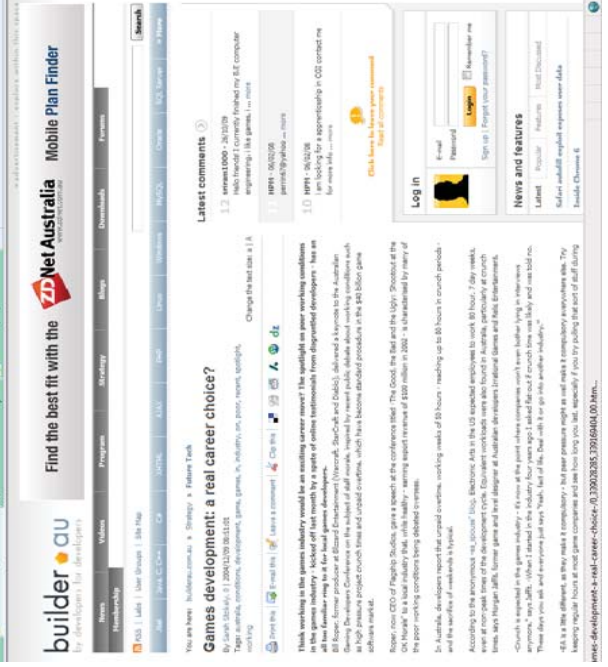
Item 32	Article	Women 'not real techies'	3/2010	ICT	http://www.womenintechology.co.uk/news/stop-the-women-techie-snobbery--news-19566445 The UK based 'women in technology' website reports that women in non technical roles in IT are being described as not "being real women" in IT.	Y
Item 33	Computerworld online	News website	3/2010	Games	 <p>NEWS ARTICLE</p> <p>News Home Email to a Friend Print this Page News Archive</p> <p>Stop the 'women techie snobbery'</p> <p>19/01/2010</p> <p>The trend of many female technology entrepreneurs being labelled as not 'real women in technology' as they are increasingly being described as 'not being real women' is a sector commentator.</p> <p>Views that these women are not really "techies", despite their business being based in the IT sector, are increasingly being expressed by some technology writers (that can be associated with technology 'geeks') which can put girls and women off the industry in the first place, said Rebecca Thompson of ComputerWeekly's VILTrend blog.</p> <p>"Irrespective of whether they climbed the ranks of developer or programmer jobs, the fact is these women work in technology. They have brought their skills, experience and ability to the technology industry. They should be applauded, not sneered at," she added.</p> <p>The reasons behind these views, it seems, is that women are seen to operate on the "lather" or more masculine sides of technology, working within the IT sphere in a portion of some wider business aims, such as in marketing and advertising or business consultancy, rather than working as code writers, developers or IT support technicians - professions that are seen as more stereotypically 'techie'.</p> <p>However, many analysts such as Ms Thompson readily argue that, as the technology sphere continues to expand into more and more varied aspects of both the social and business worlds, so the definition of what it is to work in the sector must adapt and grow.</p> <p>Certain industries which have remained stagnant in their form and business for years are now having to adapt to this, such as newspapers needing to make way for the rise of online information and the brief headlines of social media.</p> <p>Similarly, those working in the publishing industry, a time-honoured sector which has changed little over the years, are being pushed further and further into the technology sphere as they seek to capitalise on the growth in e-readers and e-zines.</p> <p>An online 'general media' article, written by academic Mary Pratt, and titled 'Computer game industry looks to women for fresh insights' http://www.computerworld.com/s/article/293317/Computer_game_industry_looks_to_women_for_fresh_insights?taxonomyId=10&intsrc=hm_topic</p>	Y
Item 34	GamesSpot	Online article	3/2010	Games	<p>EA spouse case http://au.gamespot.com/news/2004/1/1/1/news_6112998.html</p> <p>EA: The human story. http://ea-spouse.livejournal.com</p>	Y
Item 35	Women in Technology UK Email	Email via LinkedIn group promoting training opportunities to women in IT	6/2010	ICT	<p>Email announcing an evening training course for women. Highlights the need for negotiation and "Why it's necessary for women to negotiate successfully". This includes negotiating salary. The subject line reads, "why women don't ask".</p>	N - private email

					<div><div>New Delete Junk Mark as ★ Move to ★ </div><div>Reply Reply all Forward </div><div><div>"Women Don't Ask" - evening training course on Wednesday 9th J</div><div>From: messages-noreply@bounce.linkedin.com on behalf of Women in Technology UK (grou noreply@linkedin.com) Sent: Thursday, 3 June 2010 11:00:16 AM To: Anita Geneve (anitza@anitza.com)</div><div><div>LinkedIn Groups</div><div>Group: Women in Technology UK Subject: "Women Don't Ask" - evening training course on Wednesday 9th June</div><div>We first ran this course back in March 2008 and it remains one of our most popular courses ever, so we're very pleased that Michelle Brailsford is back to present 'Women Don't Ask' as evening training course next Wednesday....</div><div>Everything these days is negotiable! Every relationship – with your hairdresser, accountant, car mechanic, partner, sibling, child or parent, boss, peer or direct report – is made up of daily, weekly and yearly negotiations. Therefore, learning how to negotiate effectively is a core life skill.</div><div>You will learn: Why it's necessary for women to negotiate successfully now more than ever before; How to manage any emotional upset they may have over issues including promoting self and meritocracy versus (nepotism), class privilege, cronyism and political savvy; How to identify the common stumbling blocks that women encounter and how to pay attention to acts of self-sabotage; How assess your current negotiating style strengths and weaknesses; How to negotiate solutions that are mutually beneficial.</div><div>For more information please go to: www.womenintechology.co.uk/women-dont-ask. Many thanks! Posted by Sarah Lilley</div></div></div></div>	
Item 36	AWE and ETHE are surveys of employers while EEBTUM is a survey of employees.	ABS surveys calculate gender pay gap.	3/2010	Range	The quarterly Average Weekly Earnings (AWE) ¹⁰⁶ , the annual Employee Earnings, Benefits and Trade Union Membership (EEBTUM) ¹⁰⁷ and the biennial Employee Earnings and Hours (ETHE) ¹⁰⁸ surveys suggest women earn less than men.	N
Item 37	Online magazine article 'Builder AU'	Games development: a real career choice?	3/2010	Games	Website discusses working conditions in Australian games organisations. Spotlight on poor working conditions.	Y


¹⁰⁶ ABS, Average Weekly Earnings (Cat. No. 6302.0), May 2008.

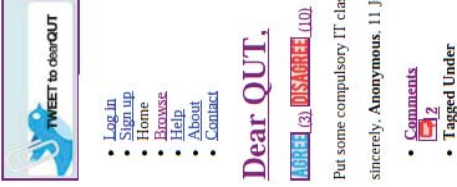
¹⁰⁷ ABS, Employee Earnings and Hours (Cat. No. 6306.0), May 2006


¹⁰⁸ ABS, Employee Earnings, Benefits and Trade Union Membership (Cat. No. 6310.0), August 2007

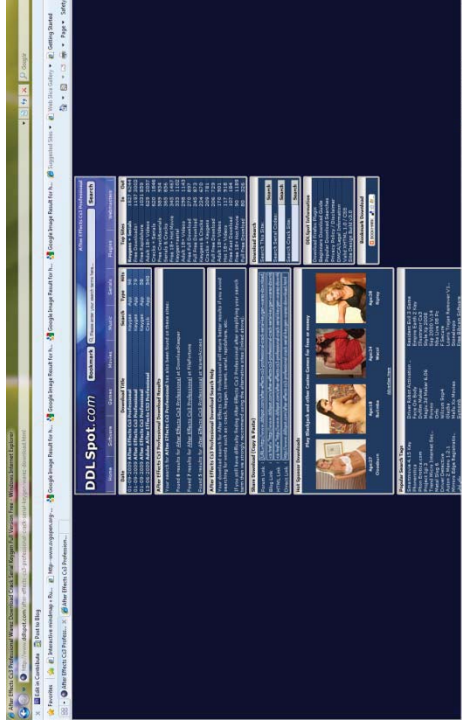
					 <p>http://www.builder.au.com.au/strategy/futuretech/soa/Games-development-a-real-career-choice-/0.339028285.339169404.00.htm</p>	
Item 38	Website advertising remote workers		3/2010	Games/Multimedia/CT	<p>Advertising that Australian companies could replace their Australian workers with remote workers and only pay \$4-\$10 dollars an hour for remote workers.</p> <p>This indicates the global pressures on local workforces.</p>	N

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

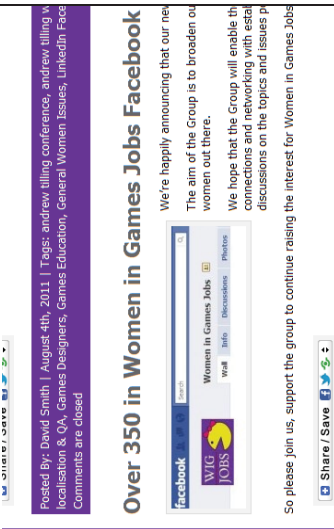
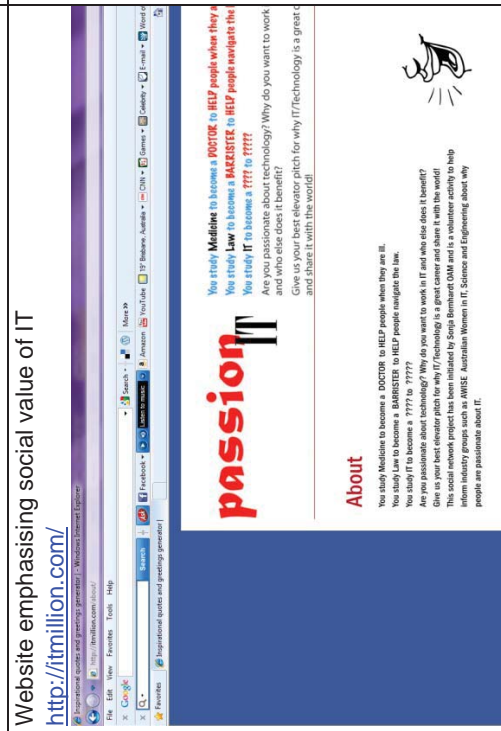

						
Item 42	Twitter like message to Brisbane university	Dear QUT website	June 2009	ICT	<p>Dear QUT is a website where students can leave feedback on their experiences at the university. "Put some compulsory IT classes in all degrees for chicks, its [sic] getting a bit lonely in the IT lectures".</p> <p>http://dearqut.com/messages/81 http://discuss.itwire.com/viewtopic.php?f=60&t=21870</p>	Y

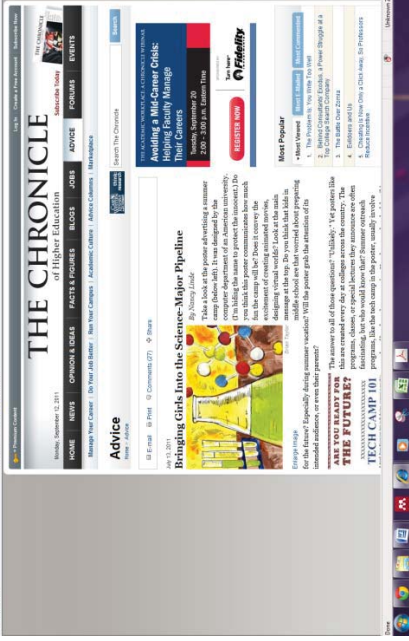

							
Item 43	Personal Blog	Blogger reflects on Wired Women event	Jan 2009	Games	http://zombietronics.blogspot.com/2009/01/wired-women.html Personal blog reflection of the Wired Women event	Y	
Item 44	Online university website		2009	Technology	http://news.illinois.edu/news/09/0303nerds.html American university professor discusses the stereotypes surrounding geeks. Headline "Geeks may be chic, but negative nerd stereotype still exists"	Y	
Item 45	List serv for socialissuegames		2010	Games	Email announcing scholarship using language that may suggest stereotyping, for example referring to a girl as a young 'lady'	Y	
Item 46	Press release		3/2010	Technology	Presents 'research' that women in technology have 'male' brains	Y	

					 <p>Women in Technology Jobs have "Male" Brains According to EQSQ.com</p> <p><i>An ongoing study by EQSQ.com, an online personality testing and career and education resource site, supports the notion that women in technical careers have "male" brains. Female test-takers with technical jobs scored 34 percent above the systemizing quotient (SQ) average of 1,038 women who took an identical test in a Cambridge University (UK) study. This latest finding demonstrates clearly Professor Simon Baron-Cohen's caution against stereotyping. The key to his Empathizing-Systemizing theory is that your sex does not determine your brain type.</i></p> <p>(PRWeb) October 2, 2006. -- Women in technical careers have "male" brains, according to an ongoing study by EQSQ.com, an online personality testing and career and education resource site. Compared to the original study completed by Professor Simon Baron-Cohen of Cambridge University, female EQSQ.com respondents scored 34 percent above the systemizing quotient (SQ) average. This finding will no doubt fuel the controversy that has raged during the last year over the classification of brains as "male" and "female."</p> <p>EQSQ.com asks respondents completing the <u>Empathizing-Systemizing personality tests</u> to classify their jobs as "technical" or "non-technical." Women who regarded their careers as "technical" scored an average SQ of 69.7 compared to the female average of 51.9, and male average of 61.2, in the Cambridge study.</p> <p>Individuals (male or female) with a "systemizing" brain tend to be driven to "analyze, understand, predict, control and construct rule-based systems." More men than women have systemizing brains and, simply because of this, the systemizing brain has been called the "male" brain. It does not mean that women cannot be systematic. By contrast, men or women with an "empathizing" brain tend to be driven to "identify another person's emotions and thoughts, and to respond to those with an appropriate emotion." <i>More women than men</i></p> <p>http://www.eweek.com/c/a/IT-Management/Report-Techs-Gender-Gap-Widened-by-Uninviting-Workplace/</p> <p>Article suggests women in IT face uninviting workplaces however still enjoy their work</p>	Y
Item 47	Online news site	E week	3/2010	Technology		Y
Item 48	Online news site	Blog.wired.com	3/2010	Games		Y
Item 49	Google search on term "Game On: Wired Women"		Jan 2009	Games		Y
Item 50	Blog	Blog linked to website "tech girls are chic: not geek".	Jan 2009	Games		N
Item 51	job advertisement	Seek online job ad	Dec 2010	Multimedia		Y



					However makes a point that this is not a joke. Suggestive that eating healthy fruit is not the 'norm' in the industry context. Also advertised under both web and IT categories, indicative of the links to the ICT industry.	
Item 52	Industry related Magazine 'Web Designer'	Special Bulletin Women on the Web	2009	Multimedia	Article interviews several female web designers working in the UK. Discusses difficulty of entering the industry.	N
Item 53	The Age newspaper online	Article	2008	Games	http://www.theage.com.au/articles/2008/05/07/1209839660016.html?page=fullpage Article recognises more young women are playing games, however the choice of products is limited. States "Many industry insiders believe the key to creating more games that appeal to women is to get more women into the industry."	N
Item 54	Insight Economics(2006) Australian Electronic Game Industry report	Report	2006	Games	Report salaries for games workers. Found that in a survey of games workers there was considerable variation in salaries for some occupations. For example, salaries for software programmers ranged from \$30,000-\$39,999 to \$90,000-\$99,999. Source: http://www.edulists.com.au/yr7-10it/Resources/Industry_Profile.pdf	N
Item 55	Telstra FITT International Women's Day (IWD) Luncheon	Advertisement for luncheon	3/2010	ICT	http://www.fitt.org.au/events.html	Y
Item 56	Google search for software crack for Dreamweaver		2009	ICT/Games/Multimedia	Search for Dreamweaver software  Search date: 2007	N

						N
Item 57	Website based initiative to foster women in games	American based	2011	Games		

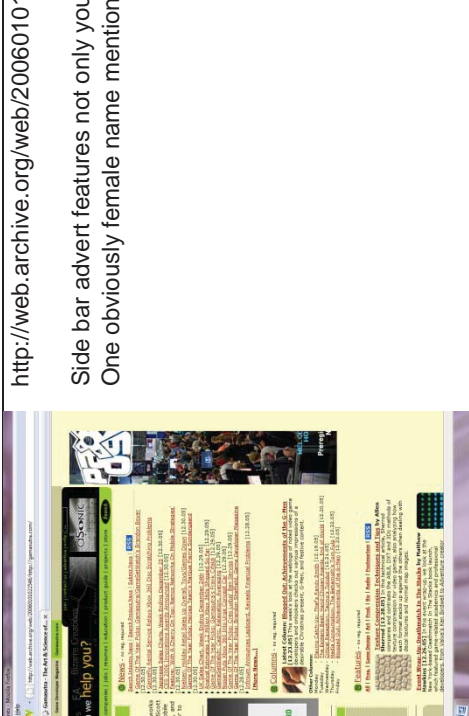
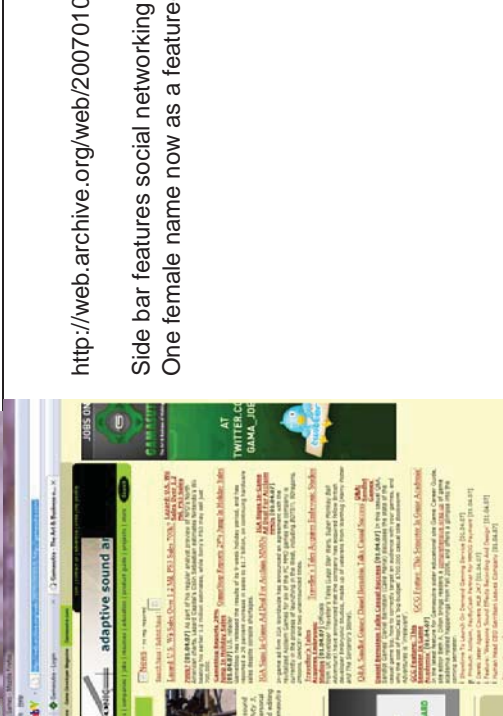
					<p>Emphasis on networking via social media.</p> 	
Item 58	Website based initiative to foster women in ICT	Website, Australian founder	2011	IT	<p>Website emphasising social value of IT</p> 	N
Item 59	Website- online article	Online article suggesting strategies aiming to improve the 'image' of technology related careers	3/2010	Technology		N

Item 60	Web site promoting women's capacity for technical skills	Website promoting women as geeks to emphasise women's technical capabilities	3/2010	Technology		Y	
Item 61	Examples of female role models from games industry	Website featuring interviews with women working in games	2008	Games	 http://multiplayerblog.mtv.com/category/women-working-in-games/	Y	Survey by industry organisation Sony Online Entertainment identifies women are intimidated by the male majority in game development organisations.
Item 62	Technology company 'Google' perceived as 'cool' by Australian Governor General	Newspaper media article	2009	Technology	Google, a key technology organisation has a public perception of being cool, which contrasts the negative connotations surrounding 'geeks' and technology.	Y	

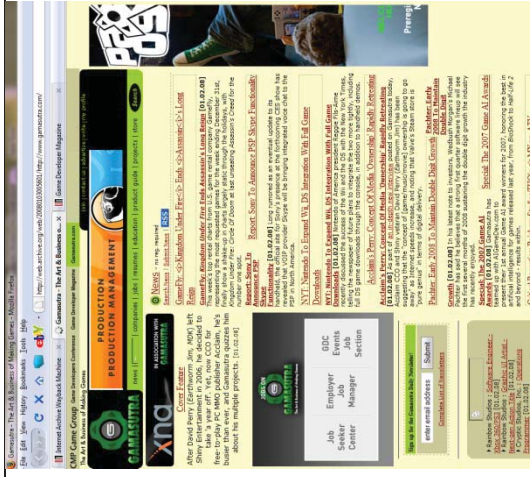
Item 29 expanded

Date	Archived document	
Jan 24 2002		<p>The main image can be interpreted as suggesting that there are only men in the games industry and that it is also only men who negotiate contracts.</p>
Jan 08 2001		<p>http://web.archive.org/web/20010108104100/http://www.gamasutra.com/ Of the ten names mentioned on the home page all would be recognised as being male names.</p>

Feb 04 2003		<p>http://web.archive.org/web/20030204025647/http://www.gamasutra.com/</p> <p>Of the names mentioned on this page all would be recognised as being male names. One news story about games audio starts with headline 'who do the BIG BOYS turn to' [original emphasis] suggesting a male dominated industry.</p>
Jan 10 2004		<p>http://web.archive.org/web/20040110035122/http://www.gamasutra.com/</p> <p>One year later, the same news story (see above).</p>
Jan 01 2005		<p>Advertising banner states, "Our passion for music & sound is matched only by our love of games", suggesting the workforce is passionate.</p> <p>There are no female writers featured.</p> <p>Educational pathways becoming more prominent on the side bar areas.</p>

<p>Jan 01 2006</p> 	<p>http://web.archive.org/web/20060101022546/http://gamasutra.com/</p> <p>Side bar advert features not only young men at an event but several older women. One obviously female name mentioned on home page.</p>
<p>2007</p> 	<p>http://web.archive.org/web/20070105050101/http://gamasutra.com/</p> <p>Side bar features social networking site 'twitter'. One female name now as a featured writer, twelve male names.</p>

2008



2008



Of nine names on front page, two could possibly be seen as being either gender. There are no obviously female names anywhere on the page.

http://web.archive.org/web/2008_0114013739/jobs.gamasutra.com/jobSeekerx/ViewAccountProfile.asp?accountno=24433&CPID=3139&Profile3139
Quote on website states "We hire the best and give them the freedom to learn and do their thing, and teamwork is the norm". This is interpreted as team work being a desired trait for the industry.

APPENDIX 18: APPROXIMATE PARTICIPATION RATES FOR WOMEN WORKING IN THE ICT, IT AND DCI (AUSTRALIA AND INTERNATIONALLY FROM 1997 TO 2007).

Table 64 Approximate participation rates for women working in the ICT, IT and DCI (Australia and internationally from 1997 to 2007).

Industry	Source	Country	Cohort	Year	Percentage	Comments
ICT industry	ABS Labour Force Survey (IBSA, 2012)	AU	All IT occupations	1997-2004	25%	Figures are the 2009 annual average for women's full-time employment
VET IT training ¹⁰⁹	Newmarch, Taylor-Steele, Cumpston (2000)	AU	Students in IT	1999	17%	
Digital Media	Recruitment firm Direct Recruitment ¹¹⁰	UK	Digital Media workers	2002	11 %	Compared with the boom era of 1999 to 2000 with figures over 30%.
Queensland computing professionals	Women in the Smart State 2003–2008: Directions Statement (Queensland Government 2003)	AU	Computing professionals	2003	20%	
American IT workforce	Untapped Talent: Diversity, Competition and America's High Tech Future (ITAA, 2005)	US	IT workforce	2004	24.9%	When administrative categories (Data Entry Keyers and Computer Operators) are excluded.
American IT workforce	Untapped Talent: Diversity, Competition and America's High Tech Future (ITAA, 2005)	US	IT workforce	2004	32.4 %	Declined from a high of 41% in 1996.
Key interactive media sectors	Skillset's 2004 Employment Census (Skillset, 2004)	UK	Employed professional	2004	33% (web) 8 % (games)	Figures are a snapshot on the day of the census
DCI (Games)	IGDA survey (Gourdin, 2005)	International	Games industry workers	2005	11.5%	
DCI (Games)	Australian Bureau of Statistics (ABS)(2008a)	AU	Games workers	2006-2007 financial year	10.7%	Games workers employed fulltime in industry, rather than those in multimedia

Last Page

¹⁰⁹ VET (Vocational Education and Training)

¹¹⁰ <http://www.auroravoice.com/pressarticle.asp?articleid=100>

Annex for Appendix 17

www.sloperama.com/advice.html

Do NOT go past this website.

A website maintained by Tom Sloper, a versatile and prolific game producer/designer/consultant/author and speaker who has developed games and toys selling over 5.5 million units, written articles for books, held speeches and taught classes in games at various high profile universities. Drawing on his extensive experience, he offers advice and encouragement, and training on just about every subject to do with the Games Industry. He has lessons covering subjects from Getting a Game Idea off the Ground and **Useful Study For Game Designers**, to **Types of Jobs in the Games Industry**, to Things You Can Do On Your Own to Prepare for a Game Career, to Lessons on How to Get Your Foot in the Door and What to Expect from the Industry. He even has the most comprehensive list of Game Related sites I have ever seen. There is no topic left uncovered and this site is a must read for anyone thinking about joining, or has a general interest in the games industry.

www.igda.org/women/

The IGDA is the International Games Developers Association. They run a comprehensive website www.igda.com covering all aspects of the industry. The site dedicated to women (as listed above) was formed to create a positive impact on the game development industry with respect to gender balance and equality. It is led by Sheri Graner Ray from Sony Online and Heather Kelley from Ubisoft. The site includes a women_dev mailing list, Women GDC sessions, recourse lists, reference guides and a discussion forum, and is one of the pioneers of the girl game movement.

www.gamegirladvance.com

This site is a girl oriented weblog and online journal that brings alternative perspectives to videogame culture. This site is dedicated to keeping up to date on the girl game movement and related topics and to passing on information. The site covers important gender issues in regards to the game industry, comprehensive discussion forums, it has a literary journal, and shop for all your game related needs. This site is an easy way to retrieve information and keep up abreast of the game market, and all the pros and cons that come with it as witnessed from a female point of view, in a fun and friendly environment.

[Girls Guide To Gaming](#)

Women and Games:
Support and Useful Information

www.womengamers.com

This site is great. It is dedicated to encouraging young women to take an interest (or to develop a current interest) in the games industry. It communicates on a mature level to its audience, while at the same the language is simple to understand and follow. Although directed primarily toward women, the site is not 'girly' and is careful not to exclude people from any age, experience or gender group. The site is for anyone interested in the industry. It is easy and fun to browse, and contains an absolute wealth of information on every subject you could possibly think of. The layout is fresh and not too busy and dispels any myths that the industry is run by geeks. I would recommend this website to anyone of any age who is interested in games and the gaming industry.

The site includes: Healthy interesting articles, great topical interviews, a resident psychologist, game reviews/previews, hardware q&a, jobs, careers advice, a discussion forum and downloads.

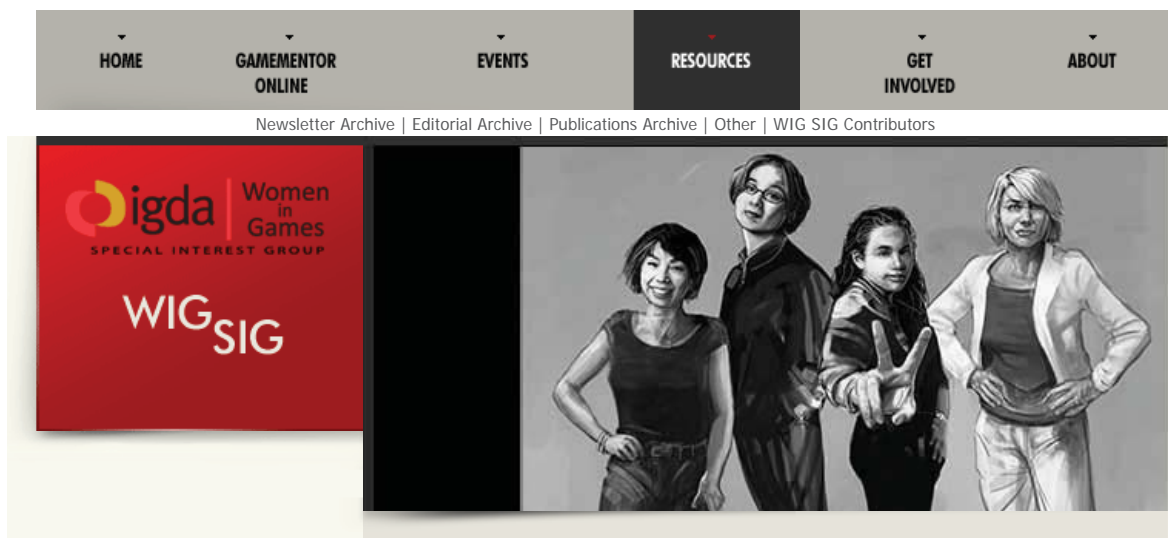
e.g. A free downloadable emulator and programming software that enables a child to build their own Game Boy Advance game. It also points to a hardware add-on that makes it possible to burn the game onto a ram card and therefore play your very own game on your personal GBA.

www.gbadev.org

For people who are interested in making their own game for Game Boy Advance (as mentioned above). There is demo software that can be downloaded for free, and space to post the game you have made along with comments so others can read about it and download it to play on their GBAs.

This site includes: Games demo's, sources and reference material (to use to make your games), mailing list, comprehensive hardware reviews, competitions, forum and a help desk.

Although the site ideally requires some prior knowledge of game building, it can be followed easily enough by the average layman. This site is perfect for the budding game designer/programmer.

**Looking for a job?**

Ready to take that next career step? Sign up to our [LinkedIn group](#) for occasional job postings.

To post jobs to IGDA Women in Games, sign up on our LinkedIn group and use the Jobs function. Do not post full job descriptions. Limit your postings to 3 per month.

Use the Jobs function as a job candidate by providing brief, occasional updates on your availability and current goals as a game professional, contractor, small business or student seeking an internship.

Newsletter Archive

Summer 2010, 07/16/2010 :: [view as webpage](#), [download PDF](#)
 Winter 2009/Spring 2010, 02/24/2010 :: [view as webpage](#), [download PDF](#)
 Summer 2009, 08/14/2009 :: [view as webpage](#), [download PDF](#)
 Spring 2009, 03/18/2009 :: [view as webpage](#), [download PDF](#)

Editorial Archive**Why aren't there more women in games?**

posted 2010 April 20 :: Guardian Careers

Women And Gaming

posted 2010 March 25 :: Forbes

Top 15 Videogames For Women

posted 2010 March 25 :: Forbes

Women in Games: From Famine to Facebook

posted 2010 March 24 :: Huffington Post

Riot Grrrls Wanted

posted 2010 January 5 :: The Escapist

Vaginophobia

posted 2010 January 5 :: The Escapist

Video Gaming Attracts Larger Female Audience In 2009

posted 2009 June 29 :: The NPD Group

Play Games to Work Smarter: Why It is More Critical than Ever that Women Play and Develop Games

posted 2009 April 15 :: GameDev.net

Megan Gaiser, President and CEO of Her Interactive Named to IGDA Women in Games Advisory Board

posted 2009 April 8 :: Yahoo! Finance

GDC: We Need More Women in Games

posted 2009 March 27 :: Edge Online

Microsoft Recognizes Game Industry Women

posted 2009 March 25 :: Edge Online

So You Want to Be a Game Designer, Part 2

posted 2009 March 16 :: Tech News World

So You Want to Be a Game Designer, Part 1

posted 2009 March 9 :: Tech News World

Women and game development: Finding a greater humanity through play

by Erin Hoffman, posted 2009 March 6 :: Georgia Straight - Vancouver

Crossing the (Gender) Divide: What designers are doing to meet the needs of female gamers.

posted 2009 January :: Sky Delta Magazine

IGDA Women's SIG Names Cherbak Chair

NEWS

Jade Raymond To Manage Ubisoft Toronto



By Tom Ivan
September 1, 2009

Share this story

See also:

Jade Redmond
Toronto
Ubisoft
Yannis Mallat

Related Articles:

Ubisoft To Open Toronto Studio
Ubisoft Acquires TrackMania
Developer
Time Extend: Beyond Good & Evil



Ubisoft has announced that *Assassin's Creed* producer Jade Raymond will manage its new Toronto, Canada-based studio when it opens later this year.

Under the governance of Yannis Mallat, CEO of Ubisoft's Montreal and Toronto studios, Raymond will oversee day-to-day operations at the new development house.

Raymond has been with Ubisoft Montreal since 2004. She worked as a producer on *Assassin's Creed* and is currently executive producer on the sequel, among other projects, Ubisoft said. She has previously held positions at Electronic Arts, IBM and Sony Online.

"I'm excited to have Jade managing our Toronto studio," said Mallat. "With more than 12 years of experience in the videogame industry, Jade's knowledge and leadership as an industry veteran are major assets in building the Toronto studio and expanding Ubisoft's presence in Canada."

Raymond added: "I'm looking forward to building a strong and talented team to work on AAA games and new intellectual properties."

First [announced in July](#), Ubisoft Toronto is due to open by the end of the 2009 and is expected to generate 800 new jobs over the next decade.



On September 1st [toadwarrior](#) said:

Her profile consists of a handful of shit games. She's only moving up to make the game industry look more diverse and, more importantly, any title she's attached to will instantly be popular with the legion of teenage boys who spank it over the thought of a pretty girl who plays games.

[Login or register to post comments](#)



On September 2nd [Jack_](#) said:

Don't belittle my fantasies! D:-

[Login or register to post comments](#)



On September 1st [Bleemo](#) said:

There's definitely something fishy about the whole Raymond thing, she was still being a presenter on some American video games related show when she was supposed to be the head honcho of over 100 people. It's shame, had Ubi just been honest and said, look Jade knows games and has the gift of the gab and we've hired her to be the spokesperson for the game people probs would have been okay with it.

[Login or register to post comments](#)



On September 1st [Peter_Pesic](#) said:

Actually she has a Bachelor's in Computer Science, entered the game industry proper as a programmer (first IBM, then at Sony), and then took a job as EA as a producer. I believe between EA and Ubisoft she has 6-7 years of experience as a Producer alone.

I don't know, that sounds like pretty solid qualifications to me. It's mind boggling how people think they can judge her abilities as a Producer, when all anyone's seen of her was when she served as the "public face" of Assassin's Creed (much like the Creative Director Patric is doing for AC2) on top of her Producer duties. Someone with experience as a Producer, is the perfect candidate to head up a studio, it's a logic step.

Electric Playground is a Canadian show, and the capacity she worked on that show was as a correspondent (I believe it had something to do with the hardware/accessory segment).

I'm willing to bet if this was a guy, and someone who is only known on the industry level (the general public only see's their name in the credits), which is often how these promotions go down, no one would say anything. Edge-online has posted plenty of these sorts of announcements, and I can't remember reading the same belittling.

Some people need to realize it's the 21st century, and that hard work, talent, and intelligence can go a long way in rising to the top.

[Login or register to post comments](#)



On September 1st [Bleemo](#) said:

I know all that but Sims online was a self admitted flop so hardly one you'd want to bring to attention when arguing your case. I mean i agree she could well be the biz we'll soon find out, but i do find it odd that someone in what is effectively a management role would be also on TV, it's a time thing. But time will tell if she does a good job or not.

[Login or register to post comments](#)



On September 1st [toadwarrior](#) said:

No one is saying she doesn't know how to program. She may very well have 6-7 years experience. What I'm talking about is fact she hasn't worked on that many games:

http://en.wikipedia.org/wiki/Jade_Raymond

<http://www.imdb.com/name/nm1817726/>

<http://www.jade-raymond.com/bio.php>

One of those games, MGS4, I assume she was only producer for a localised copy seeing how Hideo Kojima and Konami made MGS4 and not Jade and Ubisoft.

She's really only had two big titles under her belt, AC and The Sims online. I know people who've been in gaming for less than 7 years with more hit titles under their belt.

Programming, while it's not something easy to do and a respectable job, imo (after all I do it), is something loads of people can do. It doesn't make someone a head of a studio.

Assassin's Creed isn't that good and The Sims online...well I wouldn't call that triple-A.

She may very well be capable of doing the job but to deny that her gender and looks haven't been exploited especially pre-AC launch where it came to a head when this comic was made: <http://megacomrade.files.wordpress.com/2007/11/jaderaymond.gif>

There were a lot of talented people that worked on that game yet we only got to see and hear from the pretty girl. Is that fair to the rest of the team that busted their ass?

Sorry but something definitely seems fishy about the whole situation.

[Login or register to post comments](#)




On September 2nd [Peter_Pesic](#) said:

How much of an illiterate are you? She has 6-7 years experience as a Producer. She started in the industry as a programmer, in total she has 10 years experience in the industry. I'll revert back to my initial point you OBVIOUSLY do not know what being a Producer entails.

A Producer can be considered talented and successful regardless of the end product (I'm a huge fan of AC, and all my friends that played it enjoyed it, the comment isn't a slight against it). The most general duties of a game development Producer are meeting deadlines and making sure the project stays within the budget. The position is definitely much more on the business end of things than the creative/technical side, but an understanding of how the creative/technical aspects work is crucial to being good at the job. Now that makes it the perfect training ground for a head of a studio, as a large portion of that job involves making the same decisions on a macro level (and not to mention as an Executive Producer on AC2, she probably had to do a lot of higher level delegation), as well as hiring the members of the development team(s).

So to try and prove you're opinion is the facts and not sexist, you pull out the super sexist and ridiculous comic that basically implies a woman can't get anywhere just by intelligence and actual hard work? You're an absolute idiot. Before the release of Assassins Creed, every time I saw video/pictures of Jade Raymond, she was always wearing respectable and casual clothes (usually pants). Now if they were really try to leverage her sex appeal that doesn't seem like such a great strategy.

Ubisoft (and many other publishers) always try to have one particular person that's working



[Features](#) | [Resources](#) | [Community](#) | [Members](#)

search:

Features

- Game Jobs
- Product Reviews
- Contests
- GD Showcase
- Newsletter
- Advertise with Us
- About Us

Resources

- Articles & Resources
- Columns
- Books
- For Beginners
- Game Dictionary
- Wiki
- Write For Us

Community

- Forums
- GD Gathering
- Online Chat
- Workshops

Members

- Control Panel
- GDNet+ Signups!
- Developer Journals
- Member Search

Upcoming Events

- Project Bar-B-Q**
 10/15 - 10/18 @
 Burnet, TX
- Casual Connect**
 Kyiv
 10/21 - 10/23 @ Kiev,
 Ukraine
- Games & Media Expo**
 10/23 - 10/25
- Dubai World Game Expo**
 10/27 - 10/29 @ Dubai,
 United Arab Emirates

[More events...](#)

Quick Stats

6314 people currently visiting GDNet.
2329 articles in the reference section.

Help us fight cancer!
 Join SETI Team GDNet!

Play Games to Work Smarter: Why It is More Critical than Ever that Women Play and Develop Games

Posted April 15 0:22 PM by **Sande Chen**

In this panel put together by the IGDA Women in Games SIG, academics and business leaders came together to discuss the importance of video game literacy for women in the upcoming years. In addition, the leadership skills involved in playing some video games can help women succeed in their jobs.

"Cyber-socialization is different from socialization," said Diane Pozefsky, a research professor in the Department of Computer Science at the University of North Carolina at Chapel Hill. With businesses increasingly using distributed teams of people who have never met face-to-face, women who want to succeed in business will need to understand the subtleties of communication between avatars versus body language.

Moreover, the skills involved in running a remote team are the same ones needed to run a successful guild. As Phaedra Boindiris, Serious Games Product Manager for IBM Software Group, revealed, IBM has been studying MMORPGs to see how they can be used in leadership and teamwork training. The military has even used fantasy raids in video games in its training.

Tracy Fullerton, Associate Professor of Interactive Media at the University of Southern California, agreed with this practice: "Games naturally help us to understand the forces that are at work in the leadership process. It allows us to rehearse bad and good strategies in leadership."

Online games can also teach women how to deal with environments dominated by males, something that may come in handy if they decide to work in game development.

But more and more, video game technology and video games are entering fields where women, rather than men, are the dominant population. These serious games, as they are called, will become part of the tools used in corporate culture, in the classroom, and in healthcare.

Noah Falstein, a serious games consultant, noted that at the most recent Games for Health conference, the audience there was much more balanced than at GDC. There was no gender or age bias since the teams and audiences for these games exhibit diversity.

That's an ideal the panelists hope can happen for regular game development, although they acknowledge that obstacles exist.

Fullerton observed that when young women come to her game design class, they often sit in the back and think that they don't belong. She has to convince them that they do in fact play games, even if the games they like are not *Halo 3* but some Facebook app. **These young women could not imagine themselves as game designers.**

Falstein relayed a similar story: "I talked to a young woman on Monday and she said, 'I was a psychology major in college and I design games on my own, but I'm not sure if I would be a good game designer.'" The punchline was that the young woman was Erin Robinson, who two days later was one of the winners of the Game Design Challenge at GDC.

It's a familiar sentiment spoken by women, who have been beaten down by the prevailing judgment, that women aren't gamers and women shouldn't be in game design.

"The game industry has created a box around itself that says GET OUT," Fullerton said. "If you're not dedicated to hardcore games, then you're not a gamer." Instead, Fullerton felt that it was up to the industry to invite women into the fold. Research has shown that this could have a beneficial effect for games.

For instance, when boys and girls are asked to develop games, it's the girls' games that are enjoyed by everyone whereas only boys seemed to like the games they developed. Women developers tend to add more play patterns, enabling more people to enjoy the game.


Falstein remarked after telling the story of his daughter's playtime with *Diablo 2*: "Watching a bunch of 10-year-old girls play *Diablo 2* was eye-opening. It was completely different from boys." The girls tended to play collaboratively whereas boys would compete for control of the avatar.

The panelists agreed that more mainstream games, such as Wii Sports, are a positive trend for the industry. If more women play games and more women develop games, then they can be part of this growing trend.


"Hopefully, we won't have stereotypical games that young male designers think little girls want, but about what people want," said Falstein.

Menu


- ➔ [Back to GDC 2009](#)
- [See more Business and Production](#)
- [Discuss this article \(1 comments\)](#)



a gamedevnet collection



Available Now!



[About Us](#) | [Advertise on GameDev.net](#) | [Write for us](#)
 © 1999-2009 Gamedev.net. All rights reserved. [Terms of Use](#) [Privacy Policy](#)
 Comments? Questions? Feedback? [Click here!](#) GameDev.net is Powered By ISP Session
 GameDev.net™, the GameDev.net logo, and GDNet™ are trademarks of GameDev.net, LLC

<http://www.gamedev.net/columns/events/gdc2009/article.asp?id=1764>

16/10/2009

Search *The Glass Hammer* Search

- [Home](#)
- [About](#)
- [Events](#)
- [Community](#)
- [Jobs](#)

October 22nd, 2008 | 1:00 pm

What Am I Worth?

filed under [Featured](#), [Money Talks](#)

by Paige Churchman (New York City)

The first time I asked for a raise, I got it. That was way back in the 1970s. I was a secretary in an ad agency. I faced off against my boss's boss, asking for a lot more than the \$150 a week I was making. "Our secretaries don't make over \$160," he said. "Have faith," he said. "Lots of girls would do your job for free," he said. Nice try, buddy. I got \$175 a week and a promise for \$190 (what I asked for) two months later.

After I left the ad agency, my friend, Varty, busted out of the secretarial pool and became an account executive. We rejoiced...until many months later when Varty found a list of everyone's salaries in the copy machine. Big surprise: Her salary was way lower than anyone else's, except of course the secretaries'.

The good news is we no longer have to wait for chance blessings from the copier. Now you can find out in minutes how your salary stacks up. The bad news is that the data aren't much different from what Varty found — women are still making substantially less than their male counterparts. More on that later.

The Salary Sites

The two major salary sites are [Glassdoor](#) and [PayScale](#). Both are free, but you must give your compensation and other relevant information (but not your name) before you can browse. [Salary](#) and [Vault](#) are less-robust alternatives. And Vault costs money. You can also visit the [Bureau of Labor Statistics](#) to see if your position (and its estimated wage) is listed. If you're an attorney, take a look at [Lawwages](#).

PayScale: Launched six years ago, PayScale has the most information with over 15 million profiles. I have little patience with surveys, but PayScale's questions are well thought out and friendly. It even asked

how long my commute is. There's a genuine effort to capture what founder [Joe Giordano](#) calls "a richer understanding of someone's career." PayScale has attracted some good talent to slice, dice and write about its wealth of information. **Al Lee** left Microsoft because PayScale looked more interesting. Now he writes a PayScale blog called [Dr. Salary](#). (The Dr. part is real — he's got a PhD in physics.) There's also **Kristina Cowan**, [the Salary Reporter](#), who often blogs on women in the workforce. The site is rich in tools, blogs and tips. What would happen if you moved to another city? Or got your MBA? You can compare your vacation time and benefits with those of other companies. PayScale is easy to navigate. If you're looking for a promotion or a new job, you can pay about twenty bucks to get more detailed and customized reports. PayScale doesn't push you to buy. It makes its money from the 6500 companies — employers — who buy its compensation reports.

Glassdoor: Glassdoor launched in June 2008. By August it was named to PC Magazine's list of [Top 100 Undiscovered Websites](#). It was created by a couple of guys who built [Expedia](#) and transformed the travel industry by making airfares transparent. **Rich Barton** called his friend **Robert Hohman**, who had left his job as president at [Hot Wire](#), and asked, "What would happen if someone left the unedited employee survey for the whole company on the printer and it got posted to the Web?" Glassdoor is salary information plus company reviews. People weigh in on the pros and cons of their workplaces and offer advice to senior managers. ("The market can stay irrational longer than you can stay solvent," wrote a Lehman SVP) There's a lot of griping, but you do get a good idea of each company's culture. At [Netflix](#), "good modest performance is not moderated by a good modest salary but rather a generous severance." As for what it does with the numbers, Glassdoor is nowhere near as flexible or illuminating as PayScale, but Glassdoor is still in Beta.

Um, Should We Be Doing This?

Should our salaries be out there for all to see? Glassdoor's founders say people get over their initial discomfort and, hey, people under 34 have no problem. **Penelope Trunk**, a [Boston Globe](#) columnist and [blogger](#) says the only party protected by secrecy is HR — no one can see how arbitrary salary decisions are. Who wins the highest dollars? Good negotiators, personable people and people who bring in intangible benefits, she says. **Barbarama** comments on [UK MSN Money](#) that "I run the payroll, so I know exactly what everyone else is earning, and it makes my blood boil when I see the inequity of it, but I can't say anything because it's confidential." In some companies, disclosing your salary is not only taboo, it's illegal. (That policy is illegal in California and Washington.)

On the nay side is employment specialist **Ann Bares** who questions the quality of the data. In [Compensation Force](#), she says "There is a difference between the kind of pay information that employees can access for free on the Internet and the kind of pay information that most employers bank on in reviewing and setting their pay programs and practices." There's also the strong cultural taboo.

The Raise Lady Meets Dr. Salary

Laura Browne, aka [The Raise Lady](#), reminds The Glass Hammer that all this salary information is not a magic wand. "It's easy for managers to discount external information and point to non-monetary rewards the company does offer. Also, I spent years in HR and know that companies typically choose whether they'll pay at the midpoint or higher or lower, so external surveys can be misleading." Yes, use the salary comparisons, but focus on what you've done to save or make money for the company, she urges.

The Gap Is Alive and Well

Not all is transparent. You won't be able to use the salary sites to see what women make versus men, but Al Lee and Erica Sanders at PayScale put together some numbers especially for the Glass Hammer. No comment.

NEWS

Microsoft Recognizes Game Industry Women



By Edge Staff
March 26, 2009

Share this story

See also:

GDC 2009
Women

Related Articles:

GDC: We Need More Women in Games
NPD: Female Gamers On The Rise In 2009
GDC Attendance Down



Microsoft held its **first ever** Women in Gaming Awards Luncheon on Wednesday during **GDC, an intimate event recognizing the accomplishments of all women in an industry currently dominated by men.**

Winners in the four award categories were:

Art**Kiki Wolfkill**

Executive producer, director of art, Microsoft Game Studios, working on the Halo franchise

Design**Robin Hunicke**

Designer and producer at EA, working on MySims, Boom Blox!

Programming**Corrinne Yu**

Principal engine programmer, Halo Team Microsoft

Production**Siobhan Reddy**

Producer on LittleBigPlanet at Media Molecule

Attending the luncheon via video was Sims and Spore man Will Wright, who was unable to make it to the event in person. But in his message he said that in his experience in working with women, they aren't necessarily any better than men at design, but they are able to see things differently, and bring new depth to game design. In all, he'd like to see more women in senior management positions in the games industry

Sande Chen contributed to this report.



On March 26th [monkfishjoe](#) said:

just kind of draws attention to the fact they don't pay attention to women the rest of the time...

[Login or register to post comments](#)



On March 26th [Bilstar](#) said:


I mean Digital-hero. Not NerdyGirl.

[Login or register to post comments](#)



ARE YOU READY TO JOIN THE FIGHT

WARHAMMER
GAMES



THQ GAMES

Brisbane based THQ Studio Australia, a wholly owned subsidiary of international publisher and developer THQ Inc., is seeking video game development talent across all disciplines to work on an action game for Sony Playstation 3 and Microsoft Xbox 360 based on the popular Warhammer 40,000 universe from Games Workshop.

We want the most talented, most enthusiastic and motivated developers to join us and help push Brisbane and THQ Studio Australia to the forefront of Australian development. With standards high and expectations higher, only the highest potential developers are wanted to join an incredible team.

So are you ready?

WHY WORK AT THQ STUDIO AUSTRALIA

Work environment

Our studio staff hail from a range of states and countries, providing an eclectic and inspirational mix of colleagues and friends. A wide range of people brings diverse backgrounds, experiences, and interests, from surfing, partying, and camping through to gaming and poker!

Opportunities

THQ Studio Australia has access to famous international brands and studios, thanks to THQ International's strong studio system and long-term licence agreements with companies like WWE Wrestling, Nickelodeon, Games Workshop, Disney•Pixar, and great original IPs like Stuntman: Ignite, Row, and Destroy All Humans!

Maturity

With over 40 years combined management experience in our Director team, four published titles on shelves world-wide, and the strength of THQ International behind us, THQ Studio Australia can offer great benefits and stability for people seeking long-term employment in Games.

rosemary.id.au

- Home
- Index
- Tags
- About Me
- Links

The hullabaloo IT Screen Goddess Calendar (ii)

The Australian Computer Society has dropped its sponsorship deal with the IT Screen Goddess Calendar

Just when you were figuring that the whole slightly naughty calendar project was going to be a non-event... Today the debate got heated as a news article from [The Australian](#) revealed the [Australian Computer Society](#) has decided to drop its sponsorship of the IT Screen Goddess Calendar.

"With great respect to all of you who think I'm making the ACS look like wowsers, it is untenable for us to be portrayed as supporting a publication with a naked woman on the cover, in the name of improving the image of women in IT."

Mr Philip Argy, President of the ACS and senior partner with Sydney law firm Mallesons Stephen Jacques

#Source: [Sexy shots split IT industry](#) Simon Hayes July 11 2006

As you can imagine the last minute sponsorship bale-out has catapulted the [IT Screen Goddess Calendar](#) in the publicity stakes. Certainly from a sales point of view it is having the desired effect.

In the clamor of the press there is a good deal of negative views such as this article by Linda Kennedy titled "[No Bed of Roses](#)" on [CIO](#) that leaves readers in no doubt about her thoughts:

Get rid of that geeky image by portraying women as sex objects. Makes sense to me. After all, why in the world would you want to even suggest that women in IT are professionals? Let's not even think about the more positive image we might project if we profiled the incredible women who are CIOs at major organizations - well, unless you put them in a string-bikini.

#Source: [No bed of Roses](#) by Lind Kennedy

As for me I am more and more amazed. Not only that the concept got off the ground but that it continues to gain momentum!



Calendar girl website survives attack



Kim Sheree, chief executive of ICT Ecosystems, poses as Marilyn Monroe.

Louisa Hearn
July 17, 2006 - 4:14PM

A targeted denial-of-service attack from the US failed in its mission over the weekend to shut down an Australian website promoting a controversial calendar showcasing the sexy side of women who work in the IT sector.

The [Screen Goddess](#) calendar was created by IT industry worker Sonja Bernhardt to tempt more women into technology-related careers. However, it met a storm of controversy last week because some of its "models" appeared partially clad.

As debate over the calendar raged across the media, public forums and blogs, the site racked up 3.5 million hits worldwide within 24 hours. Then on Friday night it was almost struck down by a denial of service attack co-ordinated from the US.

Such attacks are generally orchestrated from multiple zombie computers, which pound a website's server with simultaneous hits, often causing it to collapse under the weight of traffic. However Sauce Soft, the host of the website, was able to keep the site up and running.

The main purpose of calendar was to parody glamorous female movie stars in a bid to smash the perception of the "geeky technologist" said Ms Bernhardt, who admitted to being "rattled" by the attack.

"We welcome debate on the calendar and the issues it raises, but our opponents should allow people to decide for themselves in an open forum, not just try to knock us down," she said.

A separate aim of the campaign is to raise awareness of women in IT and highlight their

Additional notes Monday 17th July

- It seems crazy but it is now reported in [The Age.com.au](#) that the IT Screen Goddess Calendar web site has been the victim of a denial-of-service attack.
- The Australian calendar is not the first of this type. Two other Women in IT Calendars were on [Slashdot](#). They were the [Girls of Geekdom](#) and the [Geek Gorgeous](#) calendars... *he he you really should take a gender.*
- [Sonja Bernhardt](#) is the brain behind the calendar. She has taken the time to answer critics on various blogs that have posted about this topic. I thought [Sonja posted](#) an eloquent reply to the comments on [Larvatus Prodeo](#) where a particularly strong debate has ensued!

Blog notes...

After posting [Gender Mind Bender](#) stating my concerns about the [IT Screen Goddess Calendar](#) all was quiet and it was a good reminder that my blog is visited by just a handful of family, friends and more recently, stray teenage football fans. Then a blog post by [Kay Snoliak](#) a [bit of publicity on News.com.au](#) and a [bit of adverse publicity on News.com.au](#) led to a flurry of online activity. Some of this can be tracked on this [Port80 forum](#). The Calendar went on to receive further media interest on Australian TV shows (Sunrise and A Current Affair), radio and in news print.

PS. On *A Current Affair* the same night they featured the IT Screen Goddess Calendar they also did an article on [bananas](#) ... freaky... my blog is an edition of ACA. Argh! I'm resigning.

Tags : [IT-Screen-Goddess-Calendar](#) ; [2006](#) ; [gender](#) ; [web-women](#)

0 Comments

Post a new comment

Name:

Email:

URL:

Comment:

(not displayed)

del.icio.us

Archgames ::

Archkids

Apple - Environment -

Recycle Your iPod or

Cell Phone

Chop Your Dollar at

Riverside Rugby

don't have enough to deal with already. This calendar isn't going to make men take women in IT more seriously.

- Posted by: E at July 18, 2006 08:45 AM

The images I've seen look like badly made up and poorly posed photographs of IT geeks. Too amateurish for glam and too lacking in irony for pastiche. So hardly likely to achieve its stated aims.

This could have been brought off, but it was always going to be a risky undertaking without a very deft and subtle hand.

- Posted by: terrapin at July 18, 2006 07:08 AM

Curious to read they're interested in encouraging female participation and involvement in their events.

Their events section was empty when I visited, and read 'coming soon'. The societies they're supporting are either expensive to join, or invitation-only.

This exclusive approach is a good way to ensure failure of the support networks - one of the main reasons their networks are so weak in the workforce in the first place.

I'm not too fussy. The guys I've worked with have always been good to me, but I've learnt to put up with a fair bit as well.

- Posted by: Alice R at July 18, 2006 05:51 AM

I agree with the concept of promoting that you don't have to be a **stereotypical geek** to have a career in IT, but replacing one stereotype with another as the calendar does, of a sort which is generally considered to be more harmful to young girls is not to my mind wise or helpful.

As a female programmer in the IT industry an issue I would like to see addressed is the general misconception that displaying stereotypical "geek" characteristics somehow makes you better at your job. Some of the characteristics that make up the **traditional IT "geek" stereotype include:** getting really excited about the latest hardware or software product release; playing with computer hardware in your spare time; playing computer games; avoiding all forms of physical activity that don't involve the keyboard or mouse; being a male.

These have nothing to do with the job. Amazingly it seems to be a common misconception that these characteristics somehow make you a better programmer. The aura of geekiness surrounding some IT workers gives them credibility in the industry above and beyond any demonstrated competence.

People actually seem surprised when a "geek" doesn't have enough intelligence to get their head around the logic required to make an application work correctly, and/or are so infatuated with the technology that they sacrifice project aims in order to do something "cool". This is not being good at your job by anybody's standards.

The point being that just because someone spends a lot of time around and on computers doesn't mean they are good at programming - do you assume a cleaner at a science laboratory is a good scientist just because they spend a lot of time there?

I would suggest that any calendar of IT workers should have had males in there too to avoid

[High Wired](#)

Cheesecake calendars



When a group of Yorkshire housewives posed nude in an calendar for the benefit of leukaemia and lymphoma research, they began a noble tradition of stripping off for a good cause.

Since then, fireman, winemakers, the Australian women's football team - you name it - have all done the calendar thing.

The latest mob to join in are a group of female Australian IT professionals. In a small twist to the formula, they've [posed as figures from some well-known movies](#) and not all of them are scantily clad.

[But debate rages](#). Does this help the cause of attracting women to jobs in IT? Or will it drive them away?

Have your say.

SJ Hutcheon
July 12, 2006 01:42 PM

LATEST COMMENTS

(Not Sonja Bernhardt - Sonja Fitzgerald)

I'm a helpdesk tech for a small company, and I love the IT world. The office has two women in it. Myself and the Office Administrator, who only works part-time.

It doesn't bother me. They are great people to work with, have a great sense of humour and will laugh when I add a comment into what is essentially a dirty conversation.

IT is not my sole interest, however. I also ride a motorbike, which is also perceived as a "guy thing", but is actually being taken up by women everywhere.

I'd say to the girls "Who cares if it's a 'guy thing' or not? If you want to do it, go for it and if any man (like Jayseph) tells you that you can't because you're female, tell the B*****d to 'Get F*****d'".

- Posted by: Sonja at July 18, 2006 08:58 AM

This calendar says to me: Come and work in IT and you can be the sex objects we are or maybe some of the guys you work with can download you...like the women of this industry

Upcoming training course 'Building a Confident Brand' on Thursday 8th October

womenintechnology@4matnetworks.com [womenintechnology@4matnetworks.com]

Sent: Tuesday, 8 September 2009 7:59 PM

To: ANITZA GENEVE



Are you intimidated by senior or overly confident people? Do you find yourself say 'yes' when you mean 'no'? Do you avoid putting yourself forward and miss out on opportunities? If you answered 'yes' to any of these questions, come along to our next evening workshop on Thursday 8th October where trainer and coach [Salma Shah](#) will teach you the techniques to 'Build a Confident Brand'.

There are only 14 places available on this course and we expect them to fill up fast, so please get in touch asap if you would like to attend.

Building a Confident Brand

Date: Thursday 8th October 2009

Time: 6pm to 9pm

Address: womenintechnology offices, 114 Middlesex Street, London, E1 7JH

Cost: £57 + VAT (£65.55)

We all know people who think positively and act confidently even when the cards seem well and truly stacked against them. The individual personalities of these people will vary enormously – some will be quietly spoken and others the life and soul of every occasion. What characteristics do confident people share?

The session will help you define your personal brand and build confidence in yourself. Tips and hints on how to take deliberate control of your behaviour, thoughts and emotions – your brand! The goal is to show you how this could have a huge impact on your **self confidence and your reputation both in and out of work.**

What are the workshop objectives?

- * Building a personal image and confident brand
- * Developing a personal brand plan.

Topics to be covered:

- * Why you need a brand
- * Big brand lessons
- * What's changing for you?
- * Building your image
- * Identifying your brand values
- * Personal brand inventory
- * What makes you different?
- * Confidently marketing yourself
- * Connecting with other
- * CEO of Me Inc
- * Personal brand plan

For more information please go to www.womenintechnology.co.uk/building-a-confident-brand where you can also download the booking form.

If you have any questions or would like to book a place, please email Sarah Lilley at slilley@womenin.co.uk or call on 020 7422 9213 - many thanks!

Best wishes
Sarah Lilley
Events and Training Co-ordinator
womenintechnology.co.uk

women in games

[Home](#)

[About Women in Games](#)

[Careers in the Game Industry](#)

[Contact us](#)

[Resources](#)

[Forum](#)

[Blog](#)

[Information for educators](#)

Women in Games - Mixer Events 2010

Come along to the 2010 Women in Games Mixer Events in Melbourne, Sydney and Canberra!

Meet and network with women working in game development, animation and visual effects. There are competitions and prizes to be won.

Bookings are essential - See you there!

Melbourne: 6pm, Tuesday 7th September

Sydney: 6pm, Thursday 10th September - [More Information](#)

Canberra: 6pm, Tuesday 14th September

[Click here to view photos of Sydney Mixer 2009!](#)

Getting More Women in Games

- Press Release - 6 September 2010 - [Read More... >>](#)

WomenInGames.org.au was created in order to increase the numbers of women in the game industry in Australia, and to promote game development as a viable career path for women.

Goals

- To increase awareness of careers available in the game industry, and to encourage girls and young women to choose careers in game development
- To investigate and evaluate methods of increasing the numbers of women in the game industry
- To provide a platform of networks, resources and opportunities
- To create a supportive environment to ensure women in game development reach their potential.
- To provide mentoring to women entering or working in the game industry
- To develop effective partnerships with industry and educators

Click a tag to view our links!

My Delicious Tags

advice ARG australian average-gamer beginner **blog** career careers conference consoles culture developer equity events family-friendly female-characters festival game-characters game-design game-developer **gamedev** gamer-demographics gamers **games** **gaming** gender **gender-imbalance** gender-inclusive genres **girls** image influential international interview it japan laracraft life locations **marketing** maternity news nintendo perth pervasive-games pink-games **play** policies puzzles quality-of-life recruitment related-industries review sexism stereotypes survey uk **women** workplace



dc09
SKTOP **CREATE:2009**™

for entries closing soon! Get your entry in before 30 June to share in up to

50,000 in cash and prizes

Photography, Illustration, Website Design, Design for Print, Packaging Design, Digital Media, Multimedia, Fashion & more!
[Go to the website now for more information or to enter](http://www.createawards.com.au)

www.createawards.com.au



SPONSORS:



PARTNERS:

AGIdeas Semi-Permanent

Windows Live™ Home **Hotmail** Spaces OneCare | ninemsn

Inbox (44)

From Brenda Rigney and other Women in Games International group members on LinkedIn

From: **messages-noreply@bounce.linkedin.com** on behalf of **Women in Games International Group Members** (group-digests@linkedin.com)
 Sent: Thursday, 9 October 2008 4:31:08 PM
 To: [redacted] (com)

LinkedIn

FROM WOMEN IN GAMES INTERNATIONAL GROUP MEMBER

New discussions from Women in Games International group members. [Change the frequency digest.](#)

Discussions from this week:

Brenda Rigney
Tools/Application Software Engineer at Slant Six Games, Vancouver, Canada wanted [View discussion »](#)

Slant Six Games is a videogame development studio that specializes in creating games for Sony PlayStation Portable and Sony PlayStation3 next generation console. Located just step Granville Island in beautiful Vancouver, British Columbia, we are a highly experienced team c opportunities to practice the art of video game development in a non-corporate office. We ma games the way they should be made – using creative drive, strong work ethics, efficient team and above all, a sense of fun.

Slant Six Games currently has an opportunity for a **passionate** Tools/Application Software En join our team.

The Tools/Application Software Engineer works closely with our existing production team to d write and debug leading-edge proprietary toolsets and applications for front end or gameplay

Key contribution areas:

- Develop and maintain proprietary toolsets and applications
- Provide training and tutorials to production staff
- Write clear documentation for tools, applications and scripts
- Provide technical support to production
- Assist with production technology tasks as required

A successful performer in this role will:

- Require a good level of 3D Vector and Matrix math
- Require strong C++ skills
- Preferably have experience in C# or Managed C++ - this is a definite plus
- Communicate effectively at all levels and interact well with others

9

Pro gamer Ashley Jenkins talks about sexism in the gaming community. 10/2008

The Frag Dolls are an all-female gaming group, also known as a clan, put together by games publisher Ubisoft to play in professional competitions and also get feedback on the company's games.

Related stories

- [Survey: Over a third of Aussie gamers are female](#)

Win an Xbox 360

- [Competition: Tell us what you think about girl gamers](#)

Related Coverage

- [Money matters dominate](#) NEWS.com.au, 17 Oct 2008
- [Revenge of the nerds](#) The Australian, 20 Sep 2008
- [Net Adventures - 2005](#) Adelaide Now, 1 Jan 2005
- [Readers' Comments: City bars ban under-25s - PerthNow](#) Perth Now,

Ms Jenkins said female gaming clans are not unusual because sexism is still alive and well amongst gamers.

"The problem is that right now, in the gaming community, gender sort of is a big deal and a lot of girls take flak not for anything except being girls."

"There are all kinds of clans out there of girls who got together because they were sick of being hassled by guys who didn't get it and who for some reason thought they didn't belong."

Ms Jenkins, who now works for Xbox Australia, said she was keen to have more women making great games that anyone can play.

She also looks forward to when gender becomes a "non-issue".

<http://www.news.com.au/technology/story/0,,24486913-5014239,00.html>

10/30/2008

Well-known as the creator of the experimental prototype game *Lapis*, Kelley is a game designer and multimedia artist whose work in games spans a range of content and audiences, from web games for girls to AAA games on PS2 and Xbox. Her creative work has included MOO installations and interactive video projections using Quake3 and Unreal Tournament. She is Chair of the IGDA's Special Interest Group on Women in Game Development. She states, "To reach more women with our games, we need to constantly experiment with new forms and content for gameplay."

Gabrielle Kent
Professor in Computer Games Art and Design at the University of Teesside

Kent has worked in games for nine years as a freelance concept and graphic artist, and currently as senior lecturer in Computer Games Art and Design at Teesside University. She directs Animex Game, part of the Animex International Festival of Animation and Computer Games and is a key member of the steering committee for the first annual conference for Women in Games U.K. She says, "I've delivered a number of workshops in schools to give the pupils a feel for the roles at a games company. Girls usually assume that making computer games is all about programming and mathematics. They're always surprised by the art and design-related roles and see potential careers opening up to them."

Debra Kempker
President and Publisher of Prima Games

Debra Kempker, President and Publisher of Prima Games, a division of Random House Inc., is a 15 year veteran of the games industry. In her 12 year tenure at Prima, she has led initiatives that have allowed Prima Games to become the top game guide publisher, a distinction it has held for the past few years. Prior to joining Prima Games, Kempker was Editor-in-Chief of BradyGames, an imprint of Merrilman USA. She is a graduate of Purdue University. *Full Disclosure: Next Generation's editor-in-chief is married to a Prima employee.*

Ashya Kerr
Lecturer, National University of Ireland Maynooth

Dr. Kerr's research focuses on the production, use and regulation of digital games. She has worked on a number of national and European funded research projects in these areas. As an author, she has published 'The Business and Culture of Digital Games: gamework/gamplay', and chapters in anthologies including 'Understanding Digital Games' and the forthcoming 'A Strategy Guide for Understanding Grand Theft Auto'. She is a committee member of the Irish chapter of the IGDA and of the European Women in Games conference, plus she runs the community web site www.gamdevolunteers.ie.

Arcadia Kim
COO, Electronic Arts-Los Angeles

FEATURE

Game Industry's 100 Most Influential Women

By Edge Staff
September 11, 2006

Share this story

See also:
Research
Women

Related Articles:

100 Female Games On The Rise
Study: 75 Per Cent Of UK Citizens Regularly Play Games
Research: Chinese Games Demand Quality

Robin Kaminsky
EVP, Activision Publishing

Robin Kaminsky currently oversees the company's slate and product development as well as global brand management activities. Prior to this, she served as head of global brand management for Activision Publishing. In this role, she was responsible for developing multi-tiered, cross-platform product strategies for each of the company's brand franchises, identifying unique brand and new product development opportunities, driving brand growth objectives and overseeing the company's advertising, public relations, research, creative services, business development and licensing functions.

Laura Kampo
Vice President, North American Production, Buena Vista Games

Kampo drives the production of key Disney branded video games, including handheld and console games. She oversees a team of 35 staff, and manages 50+ titles in different stages of development simultaneously. Laura started in the games industry 15 years ago, designing role-playing games at MicroPose Software, then at Take 2 Interactive at its inception. She joined The Walt Disney Company as a producer, developing animated storybooks. "Along the way, we learned to not underestimate what girls can handle and what they want out of gameplay. It doesn't have to be "soft" girls want good games that feature their favorite characters," she observes.

Perin Kaplan
Vice President, Marketing & Corporate Affairs, Nintendo of America Inc.

Kaplan oversees public relations, government affairs, investor relations and internal communications for Nintendo's business in the Western Hemisphere and plays a key role in global coordination. She is a leader in the company's top marketing team. Perin joined Nintendo as corporate communications manager in 1992. In 1996, she became Director of Corporate Affairs, expanded her responsibilities and built the department that represents the company today.

Heather Kelley
Game Designer, Artificial Mind & Movement



Women in Games: The Gamasutra 20

By Bonnie Ruberg

The first-ever Gamasutra 20, honoring the Top 20 women working in the video game industry today, has taken a peer-based approach to this important task, with Gamasutra editors working alongside industry notables to highlight the most vital personalities in the field.

Some of these women are also industry veterans, and others are newcomers, dazzling the gaming world with their novel energy and creativity.

In deciding who would make the list, the 2008 panel strove to include women from all parts of the industry -- from development, to marketing, to writing -- and to represent many different talents, both old and new.

Specifically, the panel wanted to highlight the women who are important to the gaming now, those who have a crucial hand in shaping video games as we know them today. Please note that this list is unranked - there is no particular order, and all of the featured women are equally important to the business.

To those people who think that women don't play an important role in the game industry, this panel would like to say just how hard it was to pick these 20 names.

So many more hard-working, dedicated women could have been included -- not only core developers, like designers, but also artists, PR agents, and writers. After looking closely at the often-ignored female faces of gaming, their presence really is astounding.

[Joining journalist Bonnie Ruberg to help comment on the Gamasutra 20 were veteran game designers Brenda Brathwaite and Sheri Graner Ray - who appear on the list, but were nominated by others. Both have over fifteen years experience in the industry.

The panel put their heads together to choose the most important women of the year. After picking candidates (with measures in place to ensure fairness and no self-voting), Graner Ray and Brathwaite spoke about the women nominated -- what made them influential, exciting, and even inspiring in her eyes.]

Lucy Bradshaw

Executive Producer, Electronic Arts

Career overview

As the executive producer for Will Wright's *Spore*, Lucy Bradshaw is currently working on one of the industry's most talked-about new titles. The vice president in charge of production and development at Maxis, she has produced noteworthy games like *The Sims 2* and *SimCity 4* -- and has played a large role in the development of the *Sims* series over the last decade.

Before moving to EA and Maxis in 1997, Bradshaw gained years of creative experience at studios like Activision and LucasArts.

She is also a regular speaker at conferences such as the Women in Games International and the National Youth Leadership Foundation, where she actively encourages women of all ages to pursue the creative opportunities available in the gaming industry.

Major accomplishments



Prior to her COO position with EAALA, Arcadia Kim was director of product development at the Maxis Studios, the development studio behind blockbuster franchises, *The Sims*, *The Urbz*, and *SimCity*. Under Kim's direction, the *The Lord of Rings* franchise has sold over ten million copies worldwide. Before that, Arcadia worked in EA's online division, as the Live Producer of *Majestic*, the critically acclaimed episodic online multimedia game. Arcadia started her career at EA in 2000 as the Producer at EA.com. Her first product was launching Popo.com, a leading online game destinations that attracts approximately 3.6 million unique visitors a day.

Erica Kohinke Kain
CEO, Kohinke Communications

Erica Kohinke Kain is a well-respected public relations professional with more than 10 years experience representing computer games and educational software clients. She is known throughout the games industry as one of the best, most straightforward providers of effective PR campaigns for top companies such as Buena Vista Games, Namco Bandai Games, Cryptic Studios, Sammy Studios, and Sony Online Entertainment. She is distinguished by her belief that developers should be included in the public relations process, and has worked on successful campaigns for industry players including Mythic Entertainment and Irrational Studios.

Aleks Krotoski
Game Journalist and consultant

Aleks Krotoski is a columnist for The Guardian, where she writes about the social culture of computer game entertainment, and emerging community experiences in virtual worlds. As a digital strategy consultant, she has written games industry reports covering demographics, age ratings, education and regulation. She sits on the steering committees for the Women in Games Conference, Women in Games International and the Edinburgh Interactive Entertainment Festival. Her PhD research focuses on the diffusion of innovations through online communities. She says, "My goal is to challenge the games industry to be aware of (and inspired by) the needs of an ever-expanding gaming population."

« first
> last »

Contact Us / About Us / Advertise With Us / BehindBlogs / TechBlogs / MassiveBlogs / GamesBlogs / FAQ
Subscribe To Edge Magazine / Corrections / Terms & Conditions / Privacy Policy



Copyright 2008 - 2009 Future Publishing Limited, Baaubord Court 30, Monmouth Street Bath, UK BA1 2BW
England and Wales company registration number 2008885

Linda Currie

Producer, Creat Studios

Career overview

The lead designer for *Zoo Tycoon 2* and *Zoo Tycoon 2: Extinct Animals*, both published by Microsoft in 2005, Linda Currie oversees production at her studio Blue Fang Games. Aimed at a broad-based family market, Blue Fang Games is dedicated to creating "compelling, emotionally engaging games focused on the animal kingdom."

In a career that has spanned more than twenty-five years, Currie herself has worked on at least fifteen commercial titles, and even founded her own studio, Sirtech Canada. Though no longer active, Sirtech created many important titles, such as *Jagged Alliance* and *Wizardry 8*, which won Computer Gaming World's RPG of the Year award in 2001.

Major accomplishments

Currie has worked on award-winning games, founded a studio of her own, and continues to bring color and creativity to her games after almost three decades.

Innovation

At a time when strong female presences in the gaming industry were still rare, Currie was branching out on her own and making her own games -- setting an innovative example for women developers then and now.

What her peers say

Brenda: "Linda started in the game industry at the ripe old age of 15. I think, and was actually part owner of a software company at that time (Sirtech). She and I worked together on many great series including *Wizardry* and *Jagged Alliance*, and she continues as a designer in the industry working at Blue Fang on the *Zoo Tycoon* series.

Linda's under a lot of people's radar, and doesn't get nearly as much notice as she should, but she's a consistent presence in the industry and a great inspiration for women who value smashing the glass ceiling. (She smashed it and owned it!)"



Alyssa Finley

Executive Producer, 2K Marin

Career overview

Alyssa Finley may have sealed her reputation by producing 2K's 2007 hit *BioShock*, but in her extensive career in the games industry she has actually shipped titles with almost every major publisher.

In the last few years, she has worked on *Lord of the Rings: The Two Towers* with Electronic Arts, *Demon Stone* with Atari, and *Pool of Radiance II: The Ruins of Myth Drannor* with Ubisoft.

Before coming to 2K Marin, Finley worked for LEGO, Stormfront Studios, and Irrational Games. She began her work in games in 1992 when she joined the Rebel Space for the Prodigy online service. She was once the young coder who told Gritgamer.com, "I decided to become a programmer by chance" and "I got into games as a career as a coincidence, as well," Finley has since become a true veteran.



Major accomplishments

Finley's title *BioShock* received a number of awards after its 2007 release. At the Game Developer's Choice Awards alone it was selected for "Best Visual Art," "Best Writing," and "Best Audio." The Spike TV Awards named it "Best Game," "Best Xbox360 Game," and "Best Original Score." Acclaim for the game continues to resound through all areas of the gaming industry -- put forth by fans and developers alike.

Innovation

Topped off by her 2007 critical success, Finley's games represent a



Bradshaw's personal management style has been crucial to the development of *The Sims* as gamers know it today -- the series recently named the best-selling PC game of all time, with over six million copies shipped to date.

Innovation

Working side by side with Will Wright, Bradshaw will be bringing her positive, encouraging approach to *Spore*, a game already heralded for its unique approach to world-building and god games.

Gamers will be able to see the full impact of Bradshaw's innovative influence when *Spore* is realized this September.

What her peers say

Sheri: "I am in awe of Lucy Bradshaw. She is simply one of the most competent, professional and influential women in games today. Under her expert guidance, titles from *Monkey Island 2* to *Madden NFL Football* and *The Sims* have gone on to be household names. She doesn't get near the accolades she should and I wholeheartedly respect and admire her talent and accomplishments. I can't wait to see where she and her team are going to take us with *Spore*!"

Brenda Brathwaite

Chair, Interactive Design and Game Development, Savannah College of Art and Design

Career overview

With 22 commercial titles under her belt, Brenda Brathwaite's experience in the gaming industry has included working on games as different as *Wizardry: the Mansion*. She has been involved in game development since 1981 -- making her possibly the longest continually serving woman in the game industry today. She now works as a professor at Savannah College, as well as a contract game designer.

Brathwaite was recently elected as a member of the International Game Developers Association's board of directors. As the head of the IGDA's Sex special interest group, and the author of her foundational textbook, *Sex in Video Games*, she is additionally one of the world's leading authorities on sexual content in interactive media.

Major accomplishments

In addition to her positions with the IGDA, her many years served in the industry, and her numerous conference appearances, Brathwaite recently became the chair of the Interactive Design and Game Development department at Savannah College.

Innovation

Not only has Brathwaite been extremely vocal as a woman in the gaming industry, she has also blazed a trail for all those interested in sex in game development.

What was once a rarely discussed topic has become a common point of discussion thanks to Brathwaite's work.

What her peers say

Sheri: "Brenda has worked on a string of titles that most industry members would kill to have on their resume. I can think of absolutely no one better to be the first woman asked to participate in the Game Designers' Challenge at GDC in 2008!

Also her willingness and ability to pass on her knowledge to her students is a true example of her foresight and love of the industry. Her work on sex and video games is simply another feather in her well-decorated cap. She is a designer, pioneer, teacher and most importantly someone I am honored to call friend. Tell her to strap those kiddos into that BMW of hers and meet me and my Corvette at the track anytime!"



 LOGIN

[Contribute](#) | [Press](#) | [About Us](#) | [Feedback](#) | [Scholarships](#) | [Advertise](#)

 Because Women DO Play

[Home](#) | [News](#) | [Articles](#) | [JobQuest](#) | [Games](#) | [Gear](#) | [Forums](#)

:: Gaming Magazine Ads: Failing the Female Market

[:: Write for Worr](#)

 AUTHOR: Ismini "Atari" Roby | PUBLISHED: Jan. 17, 2000 | [COMMENTS \(375\)](#)

 PAGE: 1 | [2](#) | [3](#)

Are you an enth writer who would to write juicy edi articles for a fast website? If this s [us a line](#). We wr you!

In the past, I was much more tolerant than I am now. I used to ignore the messages in computer gaming magazine advertisements that demeaned women and targeted men, because I wanted to read the reviews or learn more about the games. I did not let the ads get to me. After tackling the task of determining why game magazine readership amongst women is sitting at 5% (1), it really started to hit me: **computer gaming magazine advertisements are pathetic.**

Nearly half of gamers are female (2), yet very few of them read gaming magazines. But what do you expect when you open the latest gaming magazine to a voluptuous blonde with a hardhat and a white cut-off halter-top, standing naked behind a broken TV? Since it would be illegal for me to post examples of advertisements without the permission of the companies, let me describe some of the ads I ran across:

Type of Advertisement: Action Game

Description: This ad contains a picture of a men's bathroom, complete with a condom distributor. Instead of distributing condoms, the machine appears to distribute the female game character in this particular action game. The first slot has a tough, beefy looking woman hugging her rocket launcher between her breasts with the caption "Rocket Wrap." The second slot shows a male soldier and a female soldier from the game in an embrace. She is being swept off her feet, and the caption reads, "Close Encounters." The third slot has a voluptuous character in tight leather garb with the caption "Wild Vixen." Finally, the fourth slot shows a picture of a cyborg with the caption "Hard Steel - Make a Little Go a Long Way!" On the wall is scrawled "If you want to spank a stranger, first learn to play with yourself." Computer wires have been fed through the bottom of an occupied stall with a "Do not disturb" tag hanging off, and the writing on the stall door reads, "It's just as stimulating when you are alone."

Type of Advertisement: Game Distributor

I also found a disturbing ad for a game distributor, which was even more disturbing to me since it featured my favorite local game retailer.

Description: The ad looks back from inside the computer screen out to the room of a teenage boy. A girl who looks like she's 14 years old (definitely not over 16) is draped in a sexy pose over a chair wearing short shorts and a red tube top. The guy is grinning back at the computer screen while gripping his joystick. The caption for this ad reads, "You know you're going to score."

Type of Advertisement: Strategy Game

Description: In this advertisement, an evil-looking, sexy woman is staring back at you. The caption reads, "This is all the action you can handle."

Type of Advertisement: Hardware - Joystick

Description: A very phallic joystick fills up this page, and the stick is replaced with a stick of dynamite and the label "Handle with Care."

Type of Advertisement: Hardware - Computer System

Description: A smiling buxom blonde in a hot pink bathing suit sunbathes across a large rock with the company logo carved into it. The caption reads, "It's not what you play ... It's what you play it on."

Sexist advertisements and ads that use sex to sell their products are not the only ones failing the female market. Other types of ads that are geared towards males, and therefore ignore the female market, also alienate women. For example, a boy and his mother are standing together on the front steps of what appears to be a school. The boy is holding up a sign that reads, "My brother is a victim of bad graphics" and the mother is holding up a sign that reads, "My son is a victim of bad graphics." These type of ads target males by focusing on the male gamer, and do not depict female gamers at all. This reinforces the stereotype that males are the only ones who play games.

PAGE: 1 | [2](#) | [3](#)

Articles on WomenGamers.Com solely reflect the experiences and perspectives of the author(s). Feel free to agree or disagree in the accompanying forum thread.

deliberate misogyny within our hiring process. In spite of this, we continue to be recognized as an industry leader, making various 'best place to work' lists, and are consistently lauded as a positive example for other developers. Sad but true.»

- M, 29, **White, Uni, Canada**

#20 «There have been many arguments locally about diversity. One side argues that we should diversify, and that screening for "somebody who fits in the team" directly or indirectly prevents diversity. The other side contends that our currently low diversity stems from the fact that the pool of applicants is simply predominantly composed of white males, and that the proportion of ethnic/gender/etc. variety we have is simply a reflection of that composition.»

- M, 24, **White, Uni, Canada**

#21 «I would like to see the IGDA do more outreach to under-represented communities.»

- M, 44, **White, disabled, Uni, UK**

#22 «We are dealing with different kinds of change: owners, developers, SMEs, etc.

Some can be addressed through training programs but others will rely on more widespread societal change. Modelling diversity in games and perhaps containing sexism would be healthy starting points as well.»

- M, 55, **White, PhD, Canada**

#23 «I love diversity, but sometimes this push for it can worry me as to my chances of being employed in the future considering my race is usually viewed as a majority.»

- M, 21, **White, Uni, USA**

#24 «I should probably mention that I am a student/web developer currently in between High School and College. I am not yet a full-time developer, nor do I work for a development studio/publisher, and as such could only answer "Neutral" to many of the ranking questions. Regardless, diversity is EXTREMELY important to this industry's vitality and continued innovation. It does not take a full-time developer to grasp that. The industry as a whole is not anywhere close to where it needs to be in reaching out to anyone other than the stereotypical geeky programmer, especially when it comes to women.»

- M, 19, **White, disabled, HS, USA**

#25 «I think the lack of diversity is not through hiring practices, but by the marketing practices of publishers. They choose the demographic of who they want to sell games to, and that demographic becomes interested in games as a hobby and some choose that as a profession. The movie industry is way more diverse than the video game industry but that is because movies, for the most part, have always accepted broad diverse audiences.»

- M, 30, **Uni, USA**

#26 «I really don't care about PC "diversity". All I care about is if the people I work with are good at what we do. Our company wants the best, and as a result, we have a super diverse company with employees from all over the globe. We select the best we can find,

put on promoting diversity.»

- M, 34, **White, Uni, USA**

#11 «The most qualified person should be hired, beyond that I don't care what sexual preference, color, creed or any other pop culture label they are.»

- M, 26, **White, disabled, HS, USA**

#12 «Games are made by White Males, for White Males. I'm all for a diverse industry, it just isn't there. Marketing in the entire industry is very poor. Games either make it or don't, then copy the ones that do.»

- M, 28, **Uni, USA**

#13 «I'm tired of being the one girl designer in the company. Please make more girl designers. Caveat: if they're not any good, don't bother. I hate having to swim upstream against the current of expectations the not good ones create.»

- F(bi), 32, **White, disabled, Uni, USA**

#14 «I don't really think diversity matters, diversity for diversity's sake is both racist, sexist, and ageist. Frankly I would be insulted if another was hired over me simply because they were more "diverse"»

- M, 20, **White, Uni, Canada**

#15 «Rather than trying to prove that diversity is important, and advocating in favor of diversity, perhaps IGDA could research and identify aspects of the game business that do and do not benefit from workforce diversity in order to make investment or non-investment in workforce diversity a meaningful business decision.»

- M, 43, **White, Uni, USA**

#16 «Some of your questions are very questionable. You coming on to me?»

- M, 22, **White, disabled, HS, Canada**

#17 «I don't think workforce diversity has anything to do with making great games.

Hiring should be based solely on skills, work ethic and personality. Race, gender, sexual orientation and ethnic background have NO bearing on hiring policy.»

- M, 35, **White, Uni, USA**

#18 «I put experience and competence before diversity. I think diversity is a must, but not necessarily within the workforce. Could be through public test or counselling too. There is the question of why there is not much diversity as well...»

- M, 27, **White, Uni, Canada**

#19 «Although female novelists are well represented and well regarded within fantasy literature and approximately 30%+ of our writing applicants are female, my company has yet to hire a female writer (we have had approximately 20-30 writers on staff over the course of my 8 years with the company). I can't help but conclude that our complete lack of gender diversity within the design department is a clear and direct product of



In many ways I think we're running around chasing our own tail, and maybe that's because we've been asking the wrong questions, and are too busy playing the blame game. Let's stop asking **Where are the women in tech?** or **"Where are the women in this conference?"**

Instead, let's ask:

WHY do SOME women find it "easier" and necessary to get out there and be active in the community?

Just like with creating a user experience, personas are a powerful way to figure out what's out there. There are a lot of talented web women out there, but there are some people whose names just jump out at you. **Whitney Hess**, **Stephanie Sullivan**, and **Jina Bolton** are often called upon to speak at various conferences and have a ton of followers on social media. Perhaps instead of asking where are the women, we should ask the women who are visible their personal and professional opinions on how they get active and visible. Take personality profiles of these women, their histories, their backgrounds. What's common? What's different? Whitney speaks about how shy she normally is: how does she break free? Why are some women afraid of being "out there"?

Or is it simply that **Women just don't pimp their shit?**

Why are SOME women more comfortable or even biasee around men? (a reality in the tech industry)

Some girls just play well with boys. But we're not all tomboys nor want to be. This is a reality of the world. There is a majority of men in the tech industry; some are not as friendly to women as they should be. How can we make interactions between men and women in the workplace, in a web workplace, more congenial? Men are not the enemy: they have mothers, daughters, and sisters. Most decent men want the best for the women in their lives. How do we work together with those men to more *naturally* include women?

How can we encourage women to STAY in technology?

I have the fortunate pleasure of being friends with some brilliant women out there. In fact, many of these women have gone through, since birth, many exposures to science and technology. A set of friends of mine has a scientist for a father; one of them has an undergrad degree in computing science, the other in electrical engineering. Both very sharp, ambitious women... they went through the **WISEST** (Women in Scholarship, Engineering, Science and Technology) program, the typical encouraging and mentoring program that's meant to entice women to technology. And yet, one

lealea's blogblog

because it's nice to say it twice

[42 Comments](#) // Mar 24 2009

Women in Tech: Asking the Wrong Questions

So today is **Ada Lovelace Day** a day that brings women in technology to the forefront. For a while, this post has been brewing at the back of my head but considering this is a day celebrating women in tech, my celebrating it is understood, but I want to bring up some core issues with women in tech in the first place.

SXSWi is a great place to meet people and it was interesting that I had two distinct conversations about the same topic with **Samantha Warren** and **Ariel Newland** — where are the women in design. Now, we've been asking that question for years. In fact, SXSW has several panels about women in tech, on the web, recruiting women, understanding women, *every single year* and I find, every single year we're not really much closer to any answers. At best, solutions include mentoring and starting at an early age; at worst, conversations devolve into men-bashing and stereotypes.

Very recently, **Ryan Carson** drew some ire at **FOWA** because of the lack of female speakers or attendees; like almost every event organizer who gets flack for this, he sends out a well meaning tweet for suggestions of female speakers and to have them **tag it with #fowaspreak**. Some people took that at face value and simply recommended a few interesting people, others took offense thinking that he was simply asking for speakers for the sake of their gender. To fill a quota. At a recent local TED.com-like event, **IDEAfest** here in Edmonton, people were asked to *volunteer* to speak. First come, first served. This call-to-action occurred several weeks before the event. After the event occurred, some attendees were annoyed/flabbergasted at the lack of women or ethnic people presenting, with a thinly veiled accusation towards the organizers. At a volunteer event.

Damned if you do, damned if you don't.

A few things:

- Prejudice and sexism (both ways) exist
- The above will never be eradicated
- Education is key, but is not enough

This conversation could go on and on. Since I work from home, I never really noticed how few women are in the tech sector. With the advent and proliferation of Twitter, I've found myself conversing with many SEO, Internet Marketing experts and 99.9 percent of them are men. I wonder why this is??? I'd never given much thought to it until 2009, but it really bothers me that I have a hard time finding other females in this industry to speak with. I think women bring a different perspective and new, fresh ideas. It has been proven time and again that women think differently than men, so the tech industry could only benefit and diversify its knowledge with an infusion of estrogen.

Join the Conversation

Play nice or I'll send you to the naughty corner. Also, please feel free to use **Textile** to mark up your comment. **Use a real name** when commenting, or your comment is likely to be deleted.

If you want a little avatar, get one for free at **Gravatar**.

Name

Email

URL
http://

Message

☐ Remember my personal information

☐ Notify me of follow-up comments?

Send Comment



Name **Jen**

Date **Nov 19 2009**
02:20 PM

Hey Lea, thanks for the invite to this conversation. I'm a firm believer that there isn't a "lack" of women in technology, though it's obvious the numbers aren't as high as social work, nursing, etc., but the lack of visibility.

I don't know how we create more female role models but I believe that it's very important to do so. I feel that younger generations need people of their own gender to look up to, particularly if that younger person belongs to a minority group—i.e. women, for example.

As for solving this issue or getting answers to our questions, I think the most important thing is for women in our field that have the available time and the drive should attempt to get on panels. It only takes one pebble to start the ripple.



Name **Lea**

Date **Nov 19 2009**
06:25 PM

Hi Jen, Thanks for piping in! I also agree it's visibility that's the issue more than anything; however, I don't agree with your last paragraph. The names you've listed cite women that are repeatedly mentioned: these women *are* the "pebbles" that started the ripple... a while ago.

And yet, here we are, wondering why there aren't more women on stage yet. These women (including myself) have been speaking for YEARS and yet, we are still having this argument about visibility. And several organizers have cited inviting a lot of qualified women who simply were either too busy for their event or were otherwise unable to attend.

Meanwhile, being a great designer, content creator, developer, techie, etc does NOT automatically equal public speaker, nor should it. Great talent doesn't always translate to great communicator to massive amounts of people in a public forum.



Name **Jessica**

Date **Dec 15 2009**
09:11 PM



Thursday 16th December 2010

News Article

[News Archive \(newsSearch.aspx?mode=3&status=ARCHIVE&pagesize=3&sortby=0&sortdirection=DESC&sd=4&maxitems=50&groupitems=0\)](#)

Stop the 'women techie snobbery'

19/01/2010 The trend of many female technology entrepreneurs being labelled as not 'real women in technology' as they are writers, marketers or consultants needs to stop, according to a sector commentator.

Views that these women are not really "techies", despite their business being based in the IT sector, are "symptomatic of the insular, vaguely snobby attitude (that can be associated with technology "geeks") which can put girls and women off the industry in the first place, said Rebecca Thompson of ComputerWeekly's [WITsend blog \(http://www.computerweekly.com/blogs/witsend/\)](http://www.computerweekly.com/blogs/witsend/).



"Irrespective of whether they climbed the ranks of developer or [programmer jobs \(http://www.womenintechology.co.uk/it-development-jobs/\)](http://www.womenintechology.co.uk/it-development-jobs/), the fact is these women work in technology. They have brought their skills, experience and ability to the technology industry. They should be applauded, not sneered at," she added.

The reasons behind these views, it seems, is that women are seen to operate on the "lighter" or more [managerial sides of technology \(http://www.womenintechology.co.uk/it-management-jobs/\)](http://www.womenintechology.co.uk/it-management-jobs/), working within the IT sphere in a portion of some wider business aims, such as in marketing and advertising or business consultancy, rather than working as code writers, developers or [IT support \(http://www.womenintechology.co.uk/it-support-jobs/\)](http://www.womenintechology.co.uk/it-support-jobs/) technicians - professions that are seen as more stereotypically techie.

However, many analysts such as Ms Thompson readily argue that, as the technology sphere continues to expand into more and more varied aspects of both the social and business worlds, so the definition of what it is to work in the sector must adapt and grow.

Certain industries which have remained stagnant in their form and business for years are now having to adapt to this, such as newspapers needing to make way for the rise of online information and the brief headlines of [social media \(http://www.womenintechology.co.uk/social-networking-blogs/\)](http://www.womenintechology.co.uk/social-networking-blogs/).

Similarly, those working in the publishing industry, a time-honoured sector which has changed little since the advent of the printing press, must now enter into the technology sphere as they seek to capitalise on the growth in e-readers and e-zines.

It is in the current age where those working in such sectors, which are more cutting-edge in their development, are those who will provide the greatest assets to the growth of women in technology as a whole, Ms Thompson continued to say.


She added: "If more girls are going to join the technology industry we need [role models \(http://www.womenintechology.co.uk/role-models/\)](http://www.womenintechology.co.uk/role-models/) and these so called "non-technical" women can provide that just as well as [female chief technology officers \(http://www.womenintechology.co.uk/it-management-jobs/\)](http://www.womenintechology.co.uk/it-management-jobs/).

"It seems a little self-defeating to write off large swathes of the female technology industry because they don't necessarily fit a preconceived idea of what it is to work in IT. The sector needs a change of image and clinging on to old ideas is not going to achieve that."


[Interested in hiring more female technologists into your organisation? Get in touch with](#)

Computer game industry looks to women for fresh insights

http://www.computerworld.com/s/article/293317/Computer_game_indust...



Forrester Webcast:
Rethinking Server Virtualization
» Register today



COMPUTERWORLD

Careers

[Home](#) | [News](#) | [Blogs](#) | [Reviews](#) | [White Papers](#) | [Newsletters](#) | [IT Careers](#)

News

Blogs

Shark Bait

Knowledge Centers

Operating Systems

Networking & Internet

Mobile & Wireless

Security

Storage

Business Intelligence

Servers & Data Center

Hardware

Software

Development

Careers

Education/Training

Hiring/Recruiting

Skills

Search Job Listings

Outsourcing

Management

Government

Opinion

Columnists

SharkTank

Webcasts

Video

Podcasts

White Papers

Computerworld Reports

Zones

Case Study Library

RSS Feeds

Events

Face to Face

Virtual

Industry

This Week in Print

Print Subscriptions

Computer game industry looks to women for fresh insights

By Mary K. Pratt
June 4, 2007 12:00 PM ET

Comments (4) Recommended (109) Digg Twitter Share/Email

Computerworld - Susie Wee knows that gaming technology is crucial to the corporate world. As director of the Mobile and Media Systems Lab at Hewlett-Packard Co., Wee worked on the company's Panoply project. Panoply uses technology to create an immersive visual display that wraps around the user. Developers run algorithms in real time through equipment from VoodooPC, a designer and manufacturer of high-performance gaming computer systems acquired by HP last year, to achieve color and geometric corrections that make a scene look real, Wee explains. Imagine a race-car game where the scenery you pass while driving is realistic and almost panoramic.

HP developed Panoply in part for its Halo Collaboration Studio, a face-to-face collaboration environment. Companies can buy Halo studios to hold meetings with people in various locations, with life-size displays and real-time audio. Wee says Panoply can also be used in military training exercises, scientific visualization, home theater and, yes, computer games.

HP isn't the only woman making her mark in the male-dominated gaming field.

Jennifer Canada thought about a career as an opera singer. She also contemplated political work. But in college she got hooked on gaming, so she's now a level designer at Vicious Cycle Software Inc. in Chapel Hill, N.C.


Canada decides what events take place in each level of a video game: Does a fight happen? If so, how many enemies attack? Where does the player enter the space and encounter those enemies? Then she uses scripting to set all that up.

If the gaming industry wants to grow, it needs to attract more women like Wee and Canada. And that's good news for technology-minded women looking for more job options.

If we want to have [game] titles that reach a diverse audience, our workforce has to reflect that diversity, says Sheri Graner Ray, a game designer and developer at Siren Consulting in Austin and chairwoman of the steering committee of the nonprofit Women in Games International (WIGI).

The push for more female workers translates into opportunities for technologists who can bring new perspectives and story ideas to the games market, industry executives say.

And it's an enticing area for tech workers. Game designers, both women and men, say the industry allows them to push technology in ways that they wouldn't be able to in corporate IT departments. They also have growing opportunities to use gaming technology in innovative ways, such as in so-called serious games, training software and other applications that bridge the gulf between gaming and corporate environments.



Learn More

replay

White Papers & Webcasts

LIVE WEBCAST: Horror stories: Managing IT Across Multiple Locations
LIVE Oct 27, 2009 11:00 AM ET

LIVE WEBCAST: Top to Bottom Performance Management Excellence at the City of Chicago
LIVE Oct 29, 2009 02:00 PM ET

Natural User Interface for Enterprise Applications
Download this Complimentary White Paper! Provided by Workday.

Usability Is Everything
Download this short video! Provided by Workday.

A Truly Global HCM System
Download this Complimentary White Paper! Provided by Workday.

The Value of Real SaaS at Workday
Download this short video! Provided by Workday.

Craft a Strategy to Lower Your Total Cost of Ownership
Download this Complimentary White Paper! Provided by Workday.


SaaS at Flextronics, Inc.
Download this short Video! Provided by Workday.

Navigating the Economic Morass
Download this Guide Now!

Data Protection is not an insurance policy -you cannot buy-back lost data
Find out why you need to maintain access to critical information to run your business and remain competitive.

2009 Gartner Magic Quadrant Report
Riverbed positioned in Leaders quadrant of 2009 Gartner Magic Quadrant for WAN Optimization Controllers. In this report, Gartner helps organizations interested in WAN...

How Computrace Tracks and Secures Laptops



The Career Hub for Tech Insiders™

Dice has thousands of Health Care IT jobs today.

What's the right one for you?

Find it now

1 of 4

10/27/2009 5:31 PM

presented their team for by running their into the ground ahead of time. The current mandatory hours are 9am to 10pm -- seven days a week -- with the occasional Saturday evening off for good behavior (at 6:30pm). This averages out to an eighty-five hour work week. Complaints that these once more extended hours combined with the team's existing fatigue would result in a greater number of mistakes made and an even greater amount of wasted energy were ignored.

The stress is taking its toll. After a certain number of hours spent working the eyes start to lose focus; after a certain number of weeks with only one day off fatigue starts to accrue and accumulate exponentially. There is a reason why there are two days in a weekend -- bad things happen to one's physical, emotional, and mental health if these days are cut short. The team is rapidly beginning to introduce as many flaws as they are removing.

And the kicker: for the honor of this treatment EA salaried employees receive a) no overtime; b) no compensation time! ('comp' time is the equalization of time off for overtime -- any hours spent during a crunch accrue into days off after the product has shipped); c) no additional sick or vacation leave. The time just goes away. Additionally, EA recently announced that, although in the past they have offered essentially a type of comp time in the form of a few weeks off at the end of a project, they no longer wish to do this, and employees shouldn't expect it. Further, since the production of various games is scattered, there was a concern on the part of the employees that developers would leave one crunch only to join another. EA's response was that they would attempt to minimize this, but would make no guarantees. This is unthinkable; they are pushing the team to individual physical health limits, and literally giving them nothing for it. Comp time is a staple in this industry, but EA as a corporation wishes to "minimize" this reprieve. One would think that the proper way to minimize comp time is to avoid crunch, but this brutal crunch has been on for months, and nary a whisper about any compensation leave, nor indeed of any end of this treatment.

This crunch also differs from crunch time in a smaller studio in that it was not an emergency effort to save a project from failure. Every step of the way, the project remained on schedule. Crunching neither accelerated this nor slowed it down; its effect on the actual product was not measurable. The extended hours were deliberate and planned; the management knew what they were doing as they did it. The love of my life comes home late at night complaining of a headache that will not go away and a chronically upset stomach, and my happy supportive smile is running out.

No one works in the game industry unless they love what they do. No one on that team is interested in producing an inferior product. My heart bleeds for this team precisely BECAUSE they are brilliant, talented individuals out to create something great. They are and were more than willing to work hard for the success of the title. But that good will has only been met with abuse. Amazingly, Electronic Arts was listed #91 on Fortune magazine's "100 Best Companies to Work For" in 2003.

EA's attitude toward this -- which is actually a part of company policy, it now appears -- has been (in an anonymous quotation that I've heard repeated by multiple managers), "If they don't like it, they can work somewhere else." Put up or shut up and leave: this is the core of EA's Human Resources policy. The concept of ethics or compassion or even intelligence with regard to getting the most out of one's workforce never enters the equation: if they don't want to sacrifice their lives and their health and their talent so that a multibillion dollar corporation can continue its Godzilla-stomp through the game industry, they can work somewhere else.

But can they?

The EA Machine, paired with other nifty such as Vivendi, Sony, and Microsoft, is



Username:

ea_spouse

Password:

Remember Me

☐

Explore LJ

Life

Entertainment

Music

Culture

News & Politics

Technology

Post to

Create an Account

Forgot your login?

Login w/ OpenID

Login

ea_spouse ([ea_spouse](#)) wrote,
@ 2004-11-10 00:01:00



EA: The Human Story

My significant other works for Electronic Arts, and I'm what you might call a disgruntled spouse.

EA's bright and shiny new corporate trademark is "Challenge Everything." Where this applies is not exactly clear. Churning out one licensed football game after another doesn't sound like challenging much of anything to me; it sounds like a money farm. To any EA executive that happens to read this, I have a good challenge for you: how about safe and sane labor practices for the people on whose backs you walk for your millions?

I am retaining some anonymity here because I have no illusions about what the consequences would be for my family if I was explicit. However, I also feel no impetus to shy away from sharing our story, because I know that it is too common to stick out among those of the thousands of engineers, artists, and designers that EA employs.

Our adventures with Electronic Arts began less than a year ago. The small game studio that my partner worked for collapsed as a result of foul play on the part of a big publisher -- another common story. Electronic Arts offered a job, the salary was right and the benefits were good, so my SO took it. I remember that they asked him in one of the interviews: "how do you feel about working long hours?" It's just a part of the game industry -- few studios can avoid a crunch as deadlines loom, so we thought nothing of it. When asked for specifics about what "working long hours" meant, the interviewers coughed and glossed on to the next question; now we know why.

Within weeks production had accelerated into a 'mild' crunch: eight hours six days a week. Not bad. Months remained until any real crunch would start, and the team was told that this "pre-crunch" was to prevent a big crunch toward the end; at this point any other need for a crunch seemed unlikely, as the project was dead on schedule. I don't know how many of the developers bought EA's explanation for the extended hours; we were new and naive so we did. The producers even set a deadline; they gave a specific date for the end of the crunch, which was still months away from the title's shipping date, so it seemed safe. That date came and went. And went, and went. When the next news came it was not about a reprieve; it was another acceleration: twelve hours six days a week, 9am to 10pm.

Weeks passed. Again the producers had given a termination date on this crunch that again they failed. Throughout this period the project remained on schedule. The long hours started to take its toll on the team; people grew irritable and some started to get ill. People dropped out in droves for a couple of days at a time, but then the team seemed to reach equilibrium again and they plowed ahead. The managers stopped even talking about a day when the hours would go back to normal.

Now, it seems, is the "real" crunch, the one that the producers of this title so wisely prepared their team for by running them into the ground ahead of time. The



News	Videos	Program	Strategy	Blogs	Dow
RSS Labs User Groups Site Map					
.Net	Java, C, C++	C#	XHTML	AJAX	PHP
					Linux
					Windows

You are here: [builderau.com.au](#) [Strategy](#) [Future Tech](#)

Games development: a real career choice?

By Sarah Stokely, 0 | 2004/12/09 08:51:01

Tags: australia, conditions, development, game, games, in, industry, on, poor, recent, spotlight, working

Change the text size: [a](#) | [A](#)

Print this | E-mail this | Leave a comment | Clip this | 

Think working in the games industry would be an exciting career move? The spotlight on poor working conditions in the games industry - kicked off last month by a spate of online testimonials from disgruntled developers - has an all too familiar ring to it for local games developers.

Bill Roper, former producer at Blizzard Entertainment (Warcraft, StarCraft and Diablo), delivered a keynote to the Australian Gaming Developers Conference on the subject of staff morale, inspired by recent public debate about working conditions such as high pressure project crunch times and unpaid overtime, which have become standard procedure in the \$40 billion game software market.

Roper, now CEO of Flagship Studios, gave a speech at the conference titled "The Good, the Bad and the Ugly: Shootout at the OK Morale" to a local industry that, while healthy - earning export revenue of \$100 million in 2002 - is characterised by many of the poor working conditions being debated overseas.

In Australia, developers report that unpaid overtime, working weeks of 50 hours - reaching up to 80 hours in crunch periods - and the sacrifice of weekends is typical.

According to the anonymous "ea_spouse" blog, Electronic Arts in the US expected employees to work 80 hour, 7 day weeks, even at non-peak times of the development cycle. Equivalent workloads were also found in Australia, particularly at crunch times, says Morgan Jaffit, former game and level designer at Australian developers Irrational Games and Relic Entertainment.

-Crunch is expected in the games industry - it's now at the point where companies won't even bother lying in interviews anymore," says Jaffit. "When I started in the industry four years ago I asked flat-out if crunch time was likely and was told no. These days you ask and everyone just says 'Yeah, fact of life. Deal with it or go into another industry.'"

-EA is a little different, as they make it compulsory - but peer pressure might as well make it compulsory everywhere else. Try keeping regular hours at most game companies and see how long you last, especially if you try pulling that sort of stuff during the end of a project cycle, or near a milestone, or near E3, or near a monthly deadline."

Another developer, Perception employee David Carson, said in his year's experience in the industry, the worst crunch he'd heard of was of developers working 7 day, 70 hour weeks at the end of a project cycle. "I've never heard of anyone demanding anything like that at non-peak times," he says.

One junior developer, who declined to be identified, said "I still don't have any released titles under my belt, so the 'major crunch' is something I haven't experienced yet. But, on the other hand, I have worked several weeks where we stay until 12am every night, come in on weekends and generally get shafted as far as a social life goes."

As the value of the games industry grows (PricewaterhouseCoopers figures put it on par with Hollywood's box office takings, making over \$40 billion in 2003), developers are becoming increasingly critical of their employers failure to pay overtime during crunch project times.

Jaffit, now working at Montreal's A2M, has worked in games development companies in Australia and Canada, and says -to my knowledge, no developer job exists which offers overtime."

-The usual justification for this being unpaid is that no game company could afford to pay overtime. That seems sloppy from my point of view - if you can't afford to ask that from your employees, you shouldn't ask it. This is business, not the buddy buddy happy hour."

-The simple fact though, is that if you can exploit your workers, why wouldn't you?"

But some companies do compensate staff for overtime, according to Perception employee Dale Pearce, a quality assurance tester with 2 ½ years' experience in the industry. As a casual working at Torus in Melbourne, he received extra pay for overtime, while fulltime staff accrued holidays. -Some staff could easily rack up months worth of holiday time," he says.

-At Perception we have the option of more pay or holiday time."

Another developer, who declined to be named, said it is -incredibly hard" to get paid overtime. -The general consensus seems to be that if you have to work late, you're not doing enough work during the day."

While the developers interviewed were of the view that crunch times were an inevitable part of the industry, even the standard hours during non-peak times were long, according to Jaffit. -It's worth getting used to a 50 hour week as a bare minimum," he says. -That spikes to 70-80 hour weeks for about three months of every year.

The Relic team working on Homeworld 2 were working 80 hour weeks in the last month of the project, Jaffit says.

Sometimes crunch times blew out due to poor management, said one anonymous developer.

-The largest problem with people pulling overtime is that the people highest up on the gaming foodchain as a general rule know very little about games. This is not uncommon for the creative/IT industry, but as a result you get completely unrealistic demands just because something 'seems' easy to the uninitiated. This unfortunately starts a vicious circle, where if you won't stay late to pull off completely wild demands then they'll find someone who will, which will solidify their idea that you're just lazy instead of realistic."

The notion that hoardes of keen young developers are clamouring for jobs in game development has allowed development houses to keep conditions poor, says Jaffit. According to several developers who wished to remain anonymous, questionable practices have been experienced at a number of Australian companies.

One company was claimed to have staff working for free on the understanding that they would get paid if a publishing deal came through. One former employee of another company claimed staff had promised rewards, such as a trip to Bali as compensation for long hours, which were never delivered. -They pulled stunts like making everyone work long hours in crunch times, even if they didn't personally have lots of work to do, to 'raise morale', said one former employee.


-Almost everyone who has worked there would have something to say about the unpaid overtime, being promised stuff which never eventuates just so they'll work harder and also being told that they should do it just because it's what the industry is like."

But experienced developers don't have nearly such a great [salary] difference to other industries, said Carson, a new employee of Perception and the former co-founder and technical director of middleware start-up Hemicube.


But there is another side to the coin, according to Pearce.

-That thought is always in a number of people's minds - that if we fire you today, there will be always someone just as good as you and more keen to join up tomorrow - but I've seen a few facts to disagree with that analogy here at Perception and at Torus."

-When a person does leave a programming/art/level design job, sometimes it's extremely hard and time consuming to get a replacement who is just as qualified. There are a lot of keen people out there, but there aren't too many people that are actually good at it, or they just wouldn't suit the work environment so they won't get in."


gen-i Keep it familiar

[Subscribe to Daily Updates](#)
[Facebook](#)
[Twitter](#)
[RSS](#)


Advertise with ITWire
Find out how!

	Your IT	Business	Industry	People	Policy	Science	Reviews	Features	Opinion	Events	
--	-------------------------	--------------------------	--------------------------	------------------------	------------------------	-------------------------	-------------------------	--------------------------	-------------------------	------------------------	--

26

AUG 2010

0

Like

0

Share

Microsoft Australia makes Meter Maids 'apology'

By [Alex Zaharov-Reutt](#) Published in [Technology](#) 0 Comments

Microsoft Australia has been forced to apologise for choosing to use the Australian Gold Coast's 'Meter Maids' during its Tuesday-night welcome party, with Microsoft Australia MD Tracey Fellows declaring it 'just wrong' and 'unacceptable'.

An unexpected brouhaha has erupted during Microsoft Australia's annual Tech.Ed event concerning the hiring of the Gold Coast's iconic and skimpily dressed 'meter maids' as hosts of a remote control racing competition for Tech.Ed delegates during the Tech.Ed welcome party.

Founded in 1965 to thwart the then newly installed parking meters with attractive young women dressed in gold coloured bikinis, who went around putting extra credit into parking meters that have either expired or have nearly expired thus saving street parked car users from parking fines, **Meter Maids** are said to be a Gold Coast tradition.

Given that Microsoft was hosting a 'Women in IT' event at this year's Tech.Ed, and given the high proportion of women employed at Microsoft, there has been concern from some at the event, including some Microsoft employees, that the use of Meter Maids was decidedly inappropriate.

Some are questioning why using the world-famous, Gold Coast-based Meter Maids at a Gold Coast event is 'just wrong' and 'not acceptable', as local Microsoft MD Tracey Fellows is reported to have said, but Microsoft Australia insists it apologises for any offence caused.

Microsoft Australia is blaming its local marketing department for hiring the Meter Maids, and reports say that Microsoft's initial denial of knowing what attire the Meter Maids would wear at the Tech.Ed event was incorrect, given the report by [Asher Moses in the Sydney Morning Herald](#) (SMH) that the MD of Meter Maids says she has emails spanning a 2-3 week period in which Microsoft's local marketing people chose from a selection of outfits the Meter Maids could wear.

However, Moses' SMH report quotes Microsoft Australia saying in a statement that: "We do stand behind our first statement, however, it's our show, we take full responsibility, and it was the wrong choice."

Unfortunately for Microsoft, the issue has received worldwide attention in the tech press and will probably be looked upon sternly by Microsoft HQ in Redmond, right when Microsoft is much keener for people to focus on its upcoming Windows Phone 7 devices.

The brouhaha has given Microsoft and the Meter Maids a great boost of free publicity, while also highlighting the trend away from using or even outright banning of 'booth babes' at technology events such as the E3 gaming conference in Las Vegas, and from next year's Australian CeBIT expo.

So, um'i back to the **Windows Phone 7** and other Microsoft stuff now? The IE 9 beta is due on September 16 apparently. Presumably it will be launched without the assistance of booth babes or booth blokes. Windows 8 is due in a couple of years, maybe longer - no-one at Tech.Ed would officially or unofficially say anything about it, despite my sort-of best efforts. Oh yeah, Apple's having a **reality distorting iEvent** on September 1.


The Australian Tech.Ed event officially closes on the 27th of August, 2010, with the 2011 and future local Tech.Ed events presumably to be highly scrutinised by management to ensure no Meter Maids, Meter Men, Ninja Nerds, Psychic Pokemons or any other potentially Offensive Objects make an appearance.

Alex Zaharov-Reutt attended Tech.Ed as a guest of Microsoft.

Whitpaper Download

Network glitches disrupting important calls and meetings?

IP voice can reduce costs, but network problems can disrupt conversations and video

powered by 



- [Log in](#)
- [Sign up](#)
- [Home](#)
- [Browse](#)
- [Help](#)
- [About](#)
- [Contact](#)

Dear QUT,

AGREE (3) **DISAGREE** (10)

Put some compulsory IT classes in all degrees for chicks, its getting a bit lonely in the IT lectures.

sincerely, **Anonymous**, 11 Jun 21:16

- [Comments](#)
-  **2**
- **Tagged Under**

none

- **Happened at**

N/A

- **Faculty**

Scitech

COMMENT?

[Share](#) [Report Abuse](#) [Next Blog»](#)
[Create Blog](#) [Sign In](#)

ZOMBIETRONICS

WORKING AT MAKING ELOQUENT MY OPINIONS. ENJOY.

JANUARY 28, 2009

Wired Women

Tonight I attended the Game On talk titled Wired Women, held at the State Library of Queensland. It was being held as part of the Game On exhibition currently showing at the library.

It was facilitated by Jane Turner and the speakers were awesome, although their introductions were so long and I was just so excited to be there that I may be wrong in their job descriptions.

Associate Professor Ruth Christie is from QUT and from what I gather she works in a function to encourage people into the IT, science and engineering industries, and I know that she has a much more important job, but I really suck at taking notes (my pen was outta ink). Hannah Crosby works as an artist and designer for THQ Australia. She offered a lot of views of the artistic side of game creation, and she was very well versed in how games and gaming affect society - very well spoken. I was really interested in Penny Sweetser though, who works for 2K Australia and again I hate this phrase but - from what I gather, she majors in AI, and works in that side of game production.

Throughout the talk they discussed the topics of the lack of women with careers in the gaming industry and why this might be, and women who play games and the effect that a broadening appeal of games has to people (not just women).

Regarding the lack of women with careers in gaming, it became clear that the industry is not exactly well publicised as a career choice - both Penny and Hannah said they both had no idea you could even HAVE a job like that, until they basically fell into it. Ruth talked about how the jobs are readily available, but there is such a low percentage of girls who are taking the university courses that would make those jobs available to them. She said that the gaming industry simply cannot attract women into it. On the way home, the friend who I went with spoke with me about this - we both work in offices on the same street as game studios and yet would never have even realised that they exist in

SLIDESHOW

Loading...

TWEETS

[follow me on Twitter](#)

SUBSCRIBE TO

ABOUT ME



ZOMBIETRON
BRISBANE, QUEENSLAND,
AUSTRALIA
[VIEW MY COMPLETE
PROFILE](#)

FAVE BLOGS

violet blue ® :: open source sex

Sex News: Katy Perry,
Olympic sex test, financial
fetishism, more Lara Croft,
Hollie Stevens
3 hours ago

The Jaded Hippy

Imagining Social Justice
Through Sci-Fi TV:
From "Trek" to "Torchwood"
(Part Two: Reviewing the
Literature)
3 days ago

such abundance. Perhaps different could be said of America, but for us we always thought it was just an American thing, that kind of job wouldn't exist in Australia - but there's the proof right down the road from us. This definitely speaks about the publicising (or lack thereof) of the gaming industry. Ruth suggested more "Open Days" for school children so that they can realise this kind of career DOES exist - she believes that is the age that you need to capture someone's imagination for it.

My favourite speaker was Penny Sweetser. For every discussion of what games appeal to "normal women" or how some games are not marketed to "normal women", she was always quick to say, well, I'm a normal woman, and I play these games. She made one excellent point by saying "as long as a game doesn't actively alienate women, there are going to be women who want to play it".

When somebody remarked about the ol' glass ceiling in a gaming career for women, she countered that there was none, the gaming industry is extremely receptive of women, it's not just a boy's club, they want that diversity because many different viewpoints and backgrounds will help to create a great game.

I loved that for Penny, nothing was really about being a "woman in gaming" like it was some kind of badge or label. The final question, when asked how do they all keep passionate in their professions, she simply answered "I just love games."

There was great discussion about how women are portrayed in video games, and Lara Croft was mentioned. Hannah said that she only minded "when a character's bra size is bigger than their IQ" and stated that she thinks that gaming is about escapism and women players want to have that element that they could be or wish they were this person - just like men do. If you think about it, when are the characters in "guy's games" ever effeminate little boys? My friend and I talked later about how when playing a game that allows you to choose what gender you are, we often pick women - don't know what this says about us, although in general I prefer to play games where your character is pre-determined. As an aside, that reminds me of an excellent post I read today over at [Shakesville](#) written by [Melissa McEwan](#) where it's mentioned how kick-ass the female characters have become in fighter-arcade style games. Ling Xiaoyu FTW King of Iron Fist Tournament!

All in all, I enjoyed the talk immensely. I liked that it was

Oh, You're a FEMINIST?!

Good Moves, GMA...
2 years ago

(cup)caketastrophe!

Pumpkin Pie Cupcakes w/-
Vanilla Cream"cheese"
Frosting
2 years ago

tastyfake! - saccharine dreams from emerald city

Back in love with cross
stitch...
2 years ago

BLOG ARCHIVE

▼ 2009 (59)

► May (1)

► April (16)

► March (16)

► February (14)

▼ January (12)

stupid

Wired Women

GTFO

Here she comes

Haha!

Doubt *spoilers*

Nightmares

Hard to Define

Rat king

Out on a Limb

No ifs, ands or butts

Horror Babes

► 2008 (18)

LINKS

Etsy

Feministing

Jezebel

Literotica

more focused on the career side of the gaming industry and how it is open to women - I was pretty inspired to run out of the room and go finish my IT course.

The talk was recorded and should be available shortly on the [State Library website](#). I'll come back and update when it does get put up. In the meantime, some generous soul should head to [Steam](#) and gift me Left 4 Dead. Love you.

[The Daily Coyote](#)

[The Feminist Underground](#)

[Violet Blue: Tiny Nibbles](#)



POSTED BY ZOMBIETRON AT 8:45 PM

LABELS: [CAREERS](#), [GAMES](#), [WOMEN](#)

REACTIONS: [funny \(0\)](#) [interesting \(0\)](#) [cool \(0\)](#)

2 COMMENTS:



obliterated January 31, 2009 7:01 PM

Brisbane is, in fact, a world leader in game design and production - who'da thought?? And I can't imagine why it'd be a boys-only-job. You don't need anything that's normally associated with boy-ness to be creative, artistic or intelligent. Go get in there, girls - you can only make it better....

[Reply](#)



zombietron January 31, 2009 9:15 PM

Exactly, who'da thought, which is a big part of the problem - I had no idea!

I agree that it's not a boys-only-job, though I do think that for many, people don't even realise the many opportunities for a career in

"I think it's part of the bigger picture of how we view computers and technology," she said. "We make a distinction between business people who use PDAs and are tethered to their laptops but aren't really into it, and the 'nerds' who are really into it. So, there's some discomfort with computers that we still haven't quite resolved."

In her research, Kendall analyzed how nerds were represented in "all sorts of fun things," including advertisements for Best Buy's Geek Squad; NBC's television series "Chuck"; "Weird Al" Yankovic's "White & Nerdy" parody video; the hip-hop subculture called "Nerdcore"; and, of course, the 1984 film "Revenge of the Nerds."

The stock character nerd is typically depicted as a white male with glasses and large sets of obscure data committed to memory. (Think Martin Short as nerd-extraordinaire Ed Grimley.) But more important, Kendall discovered that nerds are often represented in a way that is specifically contrasted with black males.

"In the 'White & Nerdy' video, it shows 'Weird Al' as this white nerd, and then it contrasts him with stereotypical images of black gangsters," she said.

The implication of that stereotyping is "we have an expectation that people who understand computers are more likely to be white males," Kendall said, "and that has an effect on how women and minorities are viewed when they go into a computer-related profession."

Kendall said that though the number of minorities earning degrees in computer science has remained steady, the number of women has declined in recent years. But, she noted, those women and minorities who eventually earn computer science degrees don't always get jobs in the field after they graduate.

"When you look at who's being employed, a far lower percentage of women and minorities are being employed in computer science than are getting degrees in computer science," she said. "There's been plenty of research into why women don't go into computer science, and it's at least in part because they associate it with this kind of nerdy thing, and they think that if they go into computer science they're going to have to be anti-social. That turns people off who don't see themselves as fitting that stereotype."

If the nerd stereotype is so toxic, then why is being a geek so chic? Why, for example, are PCs personified as nerdy and Macs as the apotheosis of geeky cool in the now infamous "PC vs. Mac" ad campaign?

Kendall said there's a distinct difference between "nerds" and "geeks," despite their apparent similarities.

"The valence of the word 'geek' has really changed over



news bureau

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

RESEARCH
[Science](#)
[Gender](#)
[Business](#)
[Archives](#)

NEWS INDEX
[This Year](#)
[Slide Shows & Videos](#)
[Archives](#)

PUBLICATIONS
[Inside Illinois](#)
[Archives](#)
[II Archives](#)
[About II](#)
[Postmarks](#)

Go

MORE
[Editor's Choice:](#)
[Illinois in the News](#)

[Campus Calendar](#)
[Other News Sources](#)



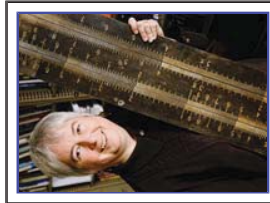
NEWS INDEX | [Archives](#) | [2009](#) | [March](#) | [Email to a friend](#)

Geeks may be chic, but negative nerd stereotype still exists, professor says

3/3/09

Phil Cidora, News Editor
217-333-2177; pcidora@illinois.edu

CHAMPAIGN, Ill. — Despite the increased popularity of geek culture — movies based on comic books, video games, virtual worlds — and the ubiquity of computers, the geek's close cousin, the nerd, still suffers from a negative stereotype in popular culture. This may help explain why women and minorities are increasingly shying away from careers in information technology, says Lori Kendall, a professor in the [Graduate School of Library and Information Science](#) at the University of Illinois at Urbana-Champaign.



Click photo to enlarge
Photo by L. Brian Stauffer
Lori Kendall, a professor in the Graduate School of Library and Information Science, says despite the increased popularity of geek culture and the ubiquity of computers, the geek's close cousin, the nerd, still suffers from a negative stereotype in popular culture. Kendall holds a familiar tool of the nerd: a slide rule.

The popular stereotype of the nerd as the sartorially challenged, anti-social white male hasn't faded from our collective cultural consciousness, and is more prevalent than ever as a stock character in television shows, movies and advertisements.

"Ten years ago, I thought the nerd stereotype would fade as more and more people started to use computers in their everyday lives," Kendall said. "I thought, 'Since we're all using computers, we're all nerds.' Well, that hasn't been true."

Kendall thinks the durability of the negative nerd stereotype reflects a basic uneasiness with computer technology and the influence it exerts over our increasingly hyper-connected digital lives.

[Home](#) [Profile](#) [People](#) [Mail](#) [Photos](#) [More ▾](#) [ninemsn ▾](#)

Hotmail

[New](#) | [Delete](#) [Junk](#) | [Mark as ▾](#) [Move to ▾](#) | [Messenger ▾](#) | [Options ▾](#)[Reply](#) [Reply all](#) [Forward](#) |

Inbox (1955)

Attachments, pictures, and links in this message have been blocked for your safety. [Show content](#)

[socialissuegames] Fwd: Computer Camp
Scholarship for a girl/young lady

[REDACTED]@gamesforchange.org)

You may not know this sender. [Mark as safe](#) | [Mark as junk](#)

Sent: Sunday, 28 February 2010 9:13:29 PM

To: Discussion of games addressing social issues
(socialissuegames@listserver.dmill.com)

Please see below:

Begin forwarded message:

[REDACTED]
Date: February 28, 2010 1:42:36 PM EST

[REDACTED]
Subject: Computer Camp Scholarship for a girl/young lady

Could you pass this on, please? The listserve said my email isn't listed.

"RTP, NC - February 17, 2010 - For the June/July 2010 enrollment, WomenGamers.Com and National Computer Camp (NCC) are once again offering a scholarship valued at \$985 to a female student (age 8-18) for one week.

At NCC (<http://www.NCCcamp.com>), campers can design a 2D or 3D video game, learn to program, create a graphic video, take apart a computer, create a home page, play tennis, play Civilization and make new friends. Now in its 33rd year, NCC is America's original computer camp with locations in Connecticut, Georgia, New York, and Ohio."

More info [here](#).

Thanks!

Laura



Women in Technology Jobs have “Male” Brains According to EQSQ.com

An ongoing study by EQSQ.com, an online personality testing and career and education resource site, supports the notion that women in technical careers have "male" brains. Female test-takers with technical jobs scored 34 percent above the systemizing quotient (SQ) average of 1,038 women who took an identical test in a Cambridge University (UK) study. This latest finding demonstrates clearly Professor Simon Baron-Cohen's caution against stereotyping. The key to his Empathizing-Systemizing theory is that your sex does not determine your brain type.

(PRWeb) October 2, 2006 -- Women in technical careers have "male" brains, according to an ongoing study by [EQSQ.com](#), an online personality testing and career and education resource site. Compared to the original study completed by Professor Simon Baron-Cohen of Cambridge University, female EQSQ.com respondents scored 34 percent above the systemizing quotient (SQ) average. This finding will no doubt fuel the controversy that has raged during the last year over the classification of brains as “male” and “female.”

EQSQ.com asks respondents completing the [Empathizing-Systemizing personality tests](#) to classify their jobs as “technical” or “non-technical.” Women who regarded their careers as “technical” scored an average SQ of 69.7 compared to the female average of 51.9, and male average of 61.2, in the Cambridge study.

Individuals (male or female) with a “systemizing” brain tend to be driven to “analyze, understand, predict, control and construct rule-based systems.” More men than women have systemizing brains and, simply because of this, the systemizing brain has been called the “male” brain. It does not mean that women cannot be systematic. By contrast, men or women with an “empathizing” brain tend to be driven to “identify another person's emotions and thoughts, and to respond to these with an appropriate emotion.” More women than men have empathizing brains, but it does not mean that men cannot have empathy. Perhaps the real controversy is over the use of “male” and “female” as the categories.

"Males' and females' brains are different by nature," agrees Louann Brizendine, author of *The Female Brain*, although it is not clear if this supports or contradicts the Empathizing-Systemizing theory. A “one size fits all” approach would be debatable because it is possible to find men with empathizing brains and women with systemizing brains. No psychology researcher investigating the Empathizing-Systemizing theory with the tests would claim that all respondents with high SQs are male or that respondents with high EQs are female.

EQ SQ tests inform respondents of their natural tendencies. Armed with the knowledge, they can then make education and [career choices](#) more suited to their personalities. It is encouraging that women and men in technical jobs who tested at EQSQ.com report higher average systemizing scores than the 2006 Cambridge sample which comprised of students from a range of disciplines. This would support the assertion made by EQSQ.com that individuals with high SQs are more inclined towards technical careers.

EQSQ.com centers on the Empathizing-Systemizing Theory of the male versus the female brain types and how this knowledge can be applied to life choices to make more informed decisions. Systemizers and empathizers can find information and resources related to education, educational programs, and career choices.

###

Report: Techs Gender Gap Widened by Uninviting Workplace

<http://www.eWeek.com/c/a/IT-Management/Report-Techs-Gender-Gap-...>

IT Management - eWeek

SEARCH

eWEEK.COM

SUBSCRIBE TO eWEEK RSS Feeds | Print | Newsletters

enterpriseHOME NEWS REVIEWS DATA STORAGE SECURITY DESKTOPS/NOTEBOOKS MOBILE/WIRELESS APP DEV BLOGS VIDEOS THE CHANNEL BUYERS GUIDE
Storage | IT Infrastructure | Virtualization | Midmarket | Enterprise Networking | Enterprise Applications | Green IT | All eWeek Topics | Slideshows | Smarter Technology


FUJITSU LifeBook® T5010 Tablet PC
Intel® Core™2 Duo Processor
No Payments for Up to 6 Months
with Bill Me Later Financing
Buy Now
Look for Intel Inside®



EnterpriseDB
The Enterprise PostgreSQL Company
Painlessly Migrate from Oracle to Open-Source PostgreSQL Plus Advanced Server!
CLICK HERE >>>

[Home](#) > [IT Management](#) > Report: Techs Gender Gap Widened by Uninviting Workplace

IT Management

Report: Techs Gender Gap Widened by Uninviting Workplace

By: Deb Perelman
2007-05-14
Article Rating:  / 5
[Share This Article](#)0
tweets
tweetTHE NEW KEY
METRIC IS TCL.
TOTAL COST
OF LOCK-IN.NETWORK
LIBERATION
MOVEMENT.NET>> JOIN US. 


**SMARTER
TECHNOLOGY
RESOURCE CENTER**
SPONSORED BY: **IBM**



Battery 500 Project
Charged Up over
All-Electric CarsCharting the Final
Frontier--Google Maps
for IndoorsGet Smarter
Technology on Your
Mobile!


eWEEK
Editorial Calendar
For a list of what
eWEEK
is covering this
year, visit our
[editorial calendar](#).



Sun
microsystems
**UNRULY SERVER SPRAWL.
NOW UNDER
NEW MANAGEMENT.**
Managing your Sun infrastructure
just got easier.

Suggested Related Content:

Articles	Labs/How-To	Multimedia
 1:  Report: Tech's Gender Gap Widened by Uninviting Workplace (2007-05-14) 2:  Tech Workplace Climate Unfavorable to Women (2008-02-22) 3:  Why Are There So Few Women Tech Entrepreneurs? (2008-05-16) 4:  Why Do Women Leave IT? (2007-06-07) 5:  Techs Glass Ceiling Shows Some Cracks (2006-06-08) 6:  Wage Gap Narrower for Women in IT (2008-04-28) 7:  Women CIOs: How To Smash the Glass Ceiling (2006-12-20)		



eWeek Videos NewsBreak Videos All Videos



Featured Video
Windows 7s New Features at Oct 22 Launch
Footage of the Windows 7 launch in NYC and a demo how a Windows 7 interface would run on a high-def television and allow for content on demand.

Newest Videos







10/27/2009 5:18 P

NEW WHITE PAPERS
SPONSORED CONTENT Red Hat Open Source Security Email Archiving: A Business Critical Application IDC: Business Value of Storage Virtualization[See All Resources >](#)

Ads by Google

Free BPM For Dummies BookImprove Productivity, Achieve Cost Efficiency, Deliver Value with BPM. info.SoftwareAG.com/BPM**Salesforce.com CRM**Highest Customer Satisfaction. Free Trials, Whitepapers & Demos. www.salesforce.com/au**Server Management Tool**Trusted by Over 8000 businesses 38 MB-Agentless-Multi-OS. Try now! OpManager.ManageEngine.com**Top 40 CRM Vendor Guide**Comprehensive CRM Vendor Research Get Latest CRM Software Rankings. Business-Software.com/Top40**Mobile Business Solutions**Business Mobility Specialists For End-To-End Field Force Solutions www.BrightSoft.com.au

There are 0 user comments on this IT Management story.

New research may shift the view of the gender gap in the tech workplace away from a lack of interest among females to the work environment itself, which women rated as unfavorable.

For years, word has circulated of a significant gender gap in the technology workplace, where women are greatly outnumbered by men.

The blame is typically placed on low interest on the part of women to pursue computers and engineering, but the actual experience of women working in technology is rarely addressed. A report released May 14 stands to shift this perception by drawing attention to the fact that tech workplaces may not be the most favorable environments for women to work in.

The vast majority of women working in the field of technology enjoy their jobs, finds the "Women in Technology 2007" report published by WITI (Women in Technology International), a trade association, and Compel, a management consulting and research firm. Of the surveys nearly 2,000 female respondents, 75 percent said that they would encourage other women to pursue similar interests.

Yet, female tech workers have mixed feelings about their companies climates, with only 52 percent believing that their organizations offer a favorable one for women.

Resource Library:

2010 Roadmap for Remotely Supporting a Mobile Workforce

Finding Buried Treasure: Overcoming Hidden IT Costs While Driving Productivity

Bridging the IT Silos: An evolutionary approach to Application Development and D

Maximizing Backup and Deduplication Performance for the Enterprise

"There is a kind of conventional wisdom that goes around that maybe women dont like technology. So, for us to learn through this research that they do like it and do find it to be a place where they can make a difference and would go as far as to recommend it to others is very telling," Patricia Schaefer, president of Compel and co-author of the report, told eWEEK.

"What was very intriguing was that such a large percentage of women said that they didnt find their organizational climates to be very inviting to women. Theyre saying that they dont feel that their voices are heard and it causes them to question whether this is an environment that they wish to stay in," said Schaefer.

Difficulties getting ahead

The report found that women in technology-related fields desired more influence in this typically male-dominated arena, and drew attention to the difficulties they faced. Many expressed that their input and presence was less in demand than that of their male co-workers, with half (48 percent) feeling that their views are not as acknowledged or welcomed as that of their male counterparts. Nearly half (44 percent) also expressed that that women in their company received fewer invitations to participate in and lead large projects.

Though female tech workers largely (73 percent) felt confident that they could influence their bosses, significantly fewer (53 percent) described themselves as broadly influential in the organization. A little over half of the respondents felt that they were in control of their careers.

 Policies and attitudes may be reasons why fewer moms are working. [Click here to read more.](#)

Schaefer said that the data that emerged from this research represents and good news/bad news scenario.

"The good news, despite conventional wisdom, is that women are highly energized by technology as an arena where they can be creative and find meaning. The bad news is they dont necessarily perceive technology organizations as inviting places to pursue their futures."

Women at the top feel differently


Female CIOs had notably different impressions of the technology work environment, based on individual in-depth interviews. For instance, the women CIOs consistently described careers replete with taking on risky projects, crafting an inspiring vision, aligning teams and forging ahead in the face of adversity.

Yet, despite these female CIOs citing role models, coaching and support networks as being essential to their success, 46 percent said they do not have a mentor in their current company. Just 27 percent said their companies had formal womens mentoring and networking programs in place.

Suggested directions

The report found that most technology organizations have not developed disciplined programs to support women employees.

"If there is a single message to technology companies and functions, its the need to get serious about committing resources to womens career development initiatives," said Dr. Barbara Trautlein, an associate at Compel and co-author of the report.

 Check out eWEEK.coms for the latest news, reviews and analysis on [IT management](#).**Rate This Article:**Poor ☐ ☐ ☐ ☐ ☒ Best

Rate

 E-mail PDF Version Print

PROPRIETARY SYSTEMS
ONLY HELP THOSE
WHO SELL THEM.

NETWORKLIBERATIONMOVEMENT.NET

>> JOIN US. 

NEWSLETTERS

EWEEK E-MAIL NEWSLETTERS bring you reliable, timely information to stay on top of the business of technology -- and technology in business -- and get more out of the Web. Make your choices and start your subscriptions today!

SUBSCRIBE

RSS Feeds

EWEEK RSS NEWS FEEDS contain a daily feed of our latest stories from over 30 different categories including Enterprise Apps, Business Intelligence, Security, VOIP and more!

Subscribe to our RSS feeds today for free...

SIGN UP 

eWEEK

SUBSCRIBE

APPLY FOR A FREE SUBSCRIPTION BELOW:

First Name:	Last Name:
<input type="text"/>	<input type="text"/>
Title:	Company:
<input type="text"/>	<input type="text"/>
Address:	City:
<input type="text"/>	<input type="text"/>
State:	Zip Code:
<input type="text"/>	<input type="text"/>
Email:	<input type="text"/>

SUBSCRIBE

[Try digital eWEEK](#)[Renew today](#)[Subscription help](#)[MORE FREE SUBSCRIPTIONS](#)

MARKETPLACE (Sponsored Links)

End Chaos in Data Centers / Server RoomsSIGN UP to Download the Free White Paper, 'Ending Data Center/Server Room Chaos'
www.apc.com**Live Webcast: Future of the Data Center**Register now to attend on Thu, Oct 29. Presented by Cisco, Microsoft and Intel.
www.cisco.com**0% Financing on All HP PSG Smart Buys!**Take Advantage of This Offer While Gaining Improved Security & Energy Savings!
www.synnex.com



GAME|LIFE

HOME SUBSCRIBE >> SECTIONS >> BLOGS >> REVIEWS >> VIDEO READ MAGAZINE

Search All Wired

« F.E.A.R. 2: Project Origin Demo Arrives Jan. 22 | Main | Browser Game: Divide To Conquer In Split 'Em Up »

Survey: Women in Games in U.K. Earn More Than Men

By Earnest Cavalli January 16, 2009 | 3:43:49 PM Categories: [Business Matters](#)

Enter to Win the [Wired Wish List Bag!](#) >



<http://blog.wired.com/games/2009/01/report-women-in.html>

27/01/2009

Survey: Women in Games in U.K. Earn More Than Men | Game | Life from Wired.com

Page 2 of 8



Bucking the trend seen in almost every other profession worldwide, women working in the gaming industry in the United Kingdom pull down a higher average salary than their male counterparts, MCV claims.

Though the report, conducted by MCV and *Develop* magazine, admits that women are a minority in the field, the average salary earned by the fairer sex averages £33,260 -- £2,000 more than similarly employed members of the male gender.

Additionally, female gaming industry employees are more optimistic about their career prospects than the men. 72 percent of female respondents showed confidence in the coming year, compared to 66 percent of male respondents.

Though this survey is far from a comprehensive, scientific effort, its findings are intriguing, if only as evidence of how progressive the gaming industry is as a whole.

Image: [Rene Ehrhardt/Flickr](#)

[Women earn more than men in the UK games industry](#) [MCV]

GAME | LIFE



Daffodils Wander Lonely as a Cloud, i...
[Visit Website](#) 04:01

Game Life

 Daffodils Wander Lonely as a ... 04:01
 Predicting 2009 Gaming Trends 14:23
 The Making of Little Big Planet 15:39
 Controversial Game Smackdown 10:43
 Game-Changing Moments of ... 06:48

[View all GameLife Videos](#)

WIRED VIDEO
Check out 100s of videos at wired.com/videos >

TEAM

We have had rumble since launch

EDITOR: Chris Kohler | [email](#)
CONTRIBUTOR: Earnest Cavalli | [email](#)
CONTRIBUTOR: Nate Ralph | [email](#)
WIRED MAG: Chris Baker

MOST RECENT ENTRIES

January 2009						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3

<http://blog.wired.com/games/2009/01/report-women-in.html>

27/01/2009

[Home](#) | [About](#) | [Contact](#) | [Advertise](#) | [Write for GG](#)

 [RSS Feed](#)



**Help Us
Help You**

Please Take Our Quick Survey >

- [News](#)
- [Gossip](#)
- [Featured](#)
 - [Reviews](#)
 - [Previews](#)
- [Xbox](#)
- [PlayStation](#)
- [Nintendo](#)
- [PC](#)
- [More Tags→](#)
 - [Mobile](#)
 - [Goodies](#)
 - [Videos](#)
 - [Images](#)

Search this website...

GO

Games Wake Up to Girl Power

January 24, 2009 by [itsamyxp](#)

[1 Comment](#)



If the internet rumours are to be believed, Lara Croft, the most famous woman in the video game world, will be showing even more skin in her next adventure.

It's a hot issue in the video games industry, which is just waking up to the female market even though women have always been enthusiastic players.

It is estimated that around 40 per cent of players on the world's biggest online games, like World of Warcraft and The Sims Online, are women, and the industry is finally taking them seriously.

Nintendo's enormously popular Wii console, with sales of more than 25 million units worldwide, has succeeded in luring a new audience by offering trivia, musical and sporting games with a family-friendly feel.

And with its handheld DS system, Nintendo has directly reached out to women, featuring Olivia Newton-John and Symantha Perkins in its Australian advertisements for Brain Training – a puzzle game.

But at the same time as Nintendo takes off, the gaming industry is feeling the impact of the economic downturn.

Studios in Australia and overseas are beginning to shed jobs, and Eidos, the makers of Tomb Raider, is not immune.

Eidos sacked 30 employees at Tomb Raider developer Crystal Dynamics and its shares fell 25% in one day after it revised down its profit forecast, due to lower than expected sales of Tomb Raider: Underworld.

The internet is now swirling with rumours the next Tomb Raider game will be rated M rather than T (for teen) – meaning it will be either sexier or bloodier.

Gamers are venting their concerns on blogs, worried creators could exploit their already buxom heroine Lara Croft, famously played by Angelina Jolie in the film spin-off.

“...I've been a fan of the series ever since the first title but isn't this just a sign of desperation? How about making an awesome game without having to pull stunts like this?” one fan wrote.

The image of a gun-toting Croft is being used to promote an exhibition of video games at the State Library of Queensland, called Game On.

As part of the exhibition, women from the industry plan a gathering to talk about how their influence is re-shaping the gaming world.

Penny Sweetser, a senior game designer with 2K Australia, said the options for women gamers should increase as more women worked in the industry.

“I guess it's easy to cater for an existing market than to create a new market – it's easy to make the types of games that have been made before than to take risks and create a new genre for a new market,” she said.

Sweetser said although Nintendo had “hit the jackpot” when it began targeting the female market, there was still little female input in games development.

“Often you're not developing for (your own demographic), you're developing for what you perceive your target market to be and (creating characters) who they would like to see,” she said.

Hannah Crosby, an artist with THQ Studios Australia, agreed that women were still getting a man's take on women's games.

At Brisbane's THQ studios, which employs about 100 staff, Crosby is one of only five women.

“Because there’s not many women working on games I guess we’re getting a very male take on what they think women want to play,” she said.

Crosby said “pink games” were another burgeoning segment of the market, encompassing games about dolls, puppies and shopping, and sometimes sold on pink consoles.

They were usually designed by men and marketed to mothers buying games viewed as safe and friendly for their daughters, she said.

“But girls who like to play games have taken things into their own hands by playing online games that aren’t made for women, but aren’t definitely only for men,” she said.

Both women view Lara Croft as an icon in the industry and in wider pop culture, and say they will watch her future appearance with interest.

Crosby, a strong advocate for female characters in games, said she’d learned to live with Croft’s appearance because of her other heroic qualities.

“It’s the sort of thing women have overlooked to this point because otherwise you wouldn’t play anything,” she said.

“Getting women into games at all at the moment is the first step before anything like what they are wearing or look like.”

Both women say “casual” games like those offered by Nintendo are best placed to survive the economic downturn, because they are cheaper to produce than “epic” games with hours of production behind them.

And both hope Lara Croft gets through this next stage with her clothes still on.

Wired Women, a talk on women in the world of gaming, will be held in Queensland on January

- [ShareThis](#)
- [Share](#)
- 0 tweet
-
-

Tags: [News](#)

Related posts:

1. [EverQuest II, Where Girl Gamers go to Avoid Testosterone](#)
2. [Alan Wake Launch Trailer is Thrilling – ‘Wake Up’](#)
3. [Epic Games Will not Develop Games For Wii](#)
4. [Next Nintendo DS Might Have GameCube Power \[Rumors\]](#)
5. [Lara Croft is Back in ‘Lara Croft and The Guardian of Light’](#)

•



Web & Graphic Designer 3 Months + Extension

13 Dec 2010

Location:
Brisbane

Salary:
\$45 - \$59.99 per hour

Classification:
Information & Communication Technology
Web Development & Production

- **Initial Contract:** 3 months
- **Extension available** for the right person

APPLY

The Australian Tourism Data Warehouse (ATDW) is the national platform for publication of tourism information on Australia.

The ATDW system is a central distribution and storage facility for tourism industry product and destination information from all Australian States and Territories. electronically accessible by tourism operators, wholesalers, retailers and distributors for use in their websites and booking systems.

To achieve this, we employ creative thinkers and true advocates of technology. Our people are a huge part of the ATDW success story, so we've developed a unique and stimulating work culture to ensure they remain engaged and inspired.

Right now we're looking for a Web Designer for an immediate start. If you are looking for a fantastic working environment and a role you can really roll up your sleeves for, then this is the opportunity for you!

What you'll do

- Be the first point of contact for all website requirements across the business;
- Be responsible for translating concepts into fully functional websites and working with people for ongoing site maintenance, updates and improvements.

We are looking for someone to take our site designs to a new level and ultimately create a more enjoyable online experience for our clients.

This will involve

- Scoping and creating design solutions in line with the ATDW and customer brand focus;
- Using your imagination and creativity to contribute to the implementation of new and updated web pages and graphics;
- Working within a team to bring funky ideas to life;
- meeting set deadlines and working within project guidelines; and
- Utilising your experience with Adobe Creative Suite and web development technologies such as JavaScript.

What you'll need

- An exceptionally creative mind;
- An innovative attitude and approach to web design and development;
- At least 2 years experience in a similar role;
- A professional and pro-active approach with a customer focused attitude;
- A proven ability to show initiative and think outside the box; and
- Design and Development skills with a keen desire to learn.

It won't hurt if you have

- Tertiary degree qualification in Graphic Design or Multimedia; and a
- knowledge of CSS, Javascript, and Flash.

What we offer

Once you're on board, we'll set you on a path with plenty of development opportunities along the way. You'll be part of a constantly changing environment that rewards you for good ideas.

There's a bevy of superb benefits to consider, including a great rate, regular social events and fresh fruit! We're not joking! Best of all, you'll work with some of the industry's brightest who know that fun is more than a three letter word.

Jason Ward
ATDW Pty Ltd
0731121760



-

You **must have the right to live and work** in this location to apply for this job.

APPLY

Related Courses

Bachelor of **Technol**
(**Information** System
Bachelor of **Technol**
Studies)
MCSE Training

[More...](#)

Be careful. Don't
or credit card det
applying for jobs.

to

[About SEEK](#)

[Contact Us](#)

[Work for SEEK](#)

[Website Terms, Promise & Privacy](#)

Australia's #1 job site, as measured by Nielsen/Netratings
SEEK Ltd. © 2010

Tech girls are chic, not just geek

www.techgirlsarechic.org

THURSDAY, JANUARY 29, 2009

Game on girls!

Have you seen the [Game On expo in Brisbane](#)? I went to it in Melbourne early last year and it was fantastic! A blast from the past, my fave part was the old Galaga stand up console! Another fave part was finding out all of the roles that make up developing a computer game, from artists to techies. I am planning to go again to the expo in Brisbane, hope to see you there!

As part of Game On, I went to the *Wired Women* panel presentation on Wednesday night. **Four fabulous role models discussed working in the Brisbane gaming industry.** Was great to see so **many high school girls** there asking questions! As part of this, the State Library have a full day of panel presentations next Friday called [More than Games](#) - a great chance to get info about working in this industry. And girls, they are calling out for you to get the qualifications and apply for jobs! There are so many [great side events to this expo](#) so dont miss out!

And wanted to share some pics with you from an AWISE planning event I was part of late last year. All of the AWISE women have been fabulous supporters of the book, and my friend Madeleine is one of the book's best supporters! You're a star Madeleine :)

TECH GIRLS ARE
CHIC, NOT JUST
GEEK



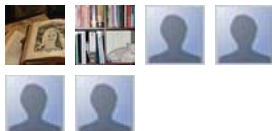
SUBSCRIBE TO

☐ Posts
 ☐ Comments

FOLLOWERS

with Google Friend Connect

Followers (6)



Already a member? [Sign in](#)

BLOG ARCHIVE

- 2010 (3)
- ▼ 2009 (25)
 - November (2)
 - October (2)
 - September (2)
 - August (1)
 - July (5)
 - May (2)
 - April (2)
 - March (5)



Our Inspirational Panel

With respected IT Journalist **MC Beverly Head** and a top line-up of speakers from Fairfax, Microsoft and Telstra, we will look at the advancements we have made, as well as some of the **many areas where women are still either stereotyped or ignored in the media.**

Our panel speakers who have kindly donated their time:

- **Anne Davies**, Journalist SMH, Fairfax Ltd
- **Pip Marlow**, new Managing Director, Microsoft Australia
- Telstra (TBC)

Bios [here](#)

By the end of the luncheon, we are sure that you will see how ICT in the media has opened the world to females wanting careers, opportunities, a voice or just balanced articles.

Please join us to celebrate IWD's first 100 years!

Agenda

We will start with a networking session over drinks before sitting down to a delicious 2-course meal with beverages and guest speakers. Our panelists will be involved an interactive session and there will be an opportunity for questions from the audience. There will be time for additional networking during the luncheon and on booking, you can request where to be seated to maximise such opportunities.

Our Event Sponsors

Headline Sponsor:

Education Sponsor:

folder

Date & Times Tuesday 8th March
Start: 12 noon Finish: 2:30 pm
Venue: Westin Hotel, (nearest train) parking nearby
Cost: Earlybird Tick FITT Member Non-Member *Corporate Tariff
Tuesday 22 Feb 2 March: FITT Member Non-Member *Corporate Tariff
*Corporate tariff paid in a single or 10 guests. seating, brand opportunity to attendee bags
How to register
Registration: Register and the AIIA website Registration &

Close ad

[Subscribe to RSS feed](#)

She's Geeky

- [Future Events](#)
 - [She's Geeky Twin Cities 2, Fall 2011](#)
 - [She's Geeky in 2011](#)
- [Past Events](#)
 - [She's Geeky Bay Area #4, January 28-30, 2011](#)
 - [She's Geeky 7: New York City, October 29-30, 2010](#)
 - [She's Geeky 6: Twin Cities August 7-8, 2010](#)
 - [She's Geeky 4: DC 10/09](#)
 - [She's Geeky 5: Bay Area 01/10](#)
 - [She's Geeky 3: Bay Area 01/09](#)
 - [She's Geeky 2: NYC 12/08](#)
 - [She's Geeky 1: Bay Area 10/07](#)
- [About](#)
- [History](#)
- [FAQs](#)
 - [How does the unconference day work?](#)
 - [What is Core to She's Geeky?](#)
 - [What are some of the benefits of attending She's Geeky?](#)
 - [She's Geeky – where did the name come from?](#)
 - [Who Comes to She's Geeky Events?](#)
 - [Why don't you have local She's Geeky Chapters?](#)
 - [How do we pick cities?](#)
- [Press](#)
- [Sponsorship](#)
- [Contact](#)
- [Blog](#)

About

She's Geeky

The brainchild of Kaliya Hamlin, [She's Geeky](#) gives women in technology and other geeky fields like engineering, math & science an opportunity to get together and discuss the unique issues they face in their respective fields. Hosting unConferences across the United States, we aim to inspire women geeks, provide a space to create enduring communities, and foster collaboration and innovation among peers.

Find out more about She's Geeky in our [FAQs](#)

History

It all began in early 2007, when a group of women working in the high-tech sector in the San Francisco Bay Area recognized a need for a gathering space. A haven where women who self-identify as geeky could meet in person to support, educate, and share experiences with one another.

As 2007 drew to a close she found five with whom she could conduct frank interviews about the highs and lows of being female in a predominantly male industry.

We're indexing those conversations in one place. Lots of mixed opinions in these Q&As and some *interesting* feedback in the comments sections.

- [Women Working In Games: G4's Morgan Webb Talks 'X-Play' And Being A Pin-Up](#)
- [Women Working In Games: Game Girl Advance's Jane Pinckard Talks Lara Croft, Male vs. Female Gamers](#)
- [Women Working In Games: 'Assassin's Creed's' Elspeth Tory On Jade Raymond And Entering The Boys' Club](#)
- [Women Working In Games: Brenda Brathwaite On Maternity Leave, Making The 'Playboy' Game And Hope For The Future](#)
- [Women Working In Games: Sega PR's Tali Fischer On Progress, Sweatpants, And Naked Women At The VGAs](#)
- [Women Working In Games: Pinckard, Brathwaite Respond To Reader Comments](#)

More Multiplayer highlights coming tomorrow!

Filed Under: [Multiplayer 2007 Highlights](#), [Women Working in Games](#)

[Comment \(1\)](#) [Email](#) [Share This](#)

Women Working In Games: Pinckard, Brathwaite Respond To Reader Comments

[2 Comments](#) | Posted by [Tracey John](#) on 12/20/07 at 8:14 am.



Last week, I posted [a series of interviews with five different women working in and around the gaming industry](#).

We heard from female journalists, developers and even a publicist, about what it's like to work in a field dominated by men. What are the advantages and disadvantages of being a woman? Did they ever feel treated differently because of their gender? They each had unique perspectives and shared personal experiences from the workplace.

We received a huge response from readers, along with some very good questions. With that, we decided to pose a few of your questions to [Game Girl Advance's Jane Pinckard](#) and ["Sex in Video Games"](#) author [Brenda Brathwaite](#) via e-mail. In my original phone interview with Pinckard, she spoke about empowering women to overcome sexism within the games industry. However, one commenter had this to say:

"Let's say you've got someone who's championing the cause of women in a specific industry, and she's all about empowering women, and against their denigration. Sounds great, right? Then you look back at her own history, and find that she's done some of the exploitative things to herself on her own, like writing an article about how she used [a gaming](#)



San Francisco — Girls want to make games, too. It's just that they're intimidated.

At least that's what a survey conducted by **Sony Online Entertainment** has revealed. Conducted among female students currently enrolled in game design, programming and visual effects at The Art Institutes schools, the survey showed that 61% "believe male dominance in the industry is a deterrent to women pursuing a career in gaming" and 42% "would like to see women portrayed as leaders in video games."

As a result, this inspired SOE to form **G.I.R.L.**

(Gamers In Real Life), a scholarship program to educate and recruit women in the video game industry. The announcement of the scholarship program was made during the Game Developers Conference last month at an event for SOE's upcoming spy-themed MMO **"The Agency."**

Representatives of G.I.R.L. included some of SOE's executive staff as well as women working directly on **"The Agency"** from SOE Seattle, like producers **Sherry Floyd** and **Heather Sowards**.

Being that [women working in games](#)

is a topic I'm quite interested in, I sat down with both Floyd and Sowards the day after the event to talk about what it's like to be women working in a male-dominated field.

One reason why it's good to have women in games? They know how female video game characters should dress. During my conversation with Floyd, who works on the art content of **"The Agency,"** she told me:

"We have to do a lot of women's clothing; half of the characters in the game are women. ... I think it's really good to have a female perspective there. I know more than once I've talked to an artist and said, 'Um, you can't cut the sleeves like that because her bra would show.' You've got full-figured women in the game, and they would have to wear a bra! [laughs] Actually, everybody's really respectful about it, and we do laugh a lot when we have these conversations. And I would say the men in our creative group definitely know a lot more about shoes, the cuts of blazers, A-line skirts versus pencil skirts and everything else than they ever cared to know. But they're definitely educated now, and they've educated me as well, so it's been really good."

[Read more...](#)

Filed Under: [Gender](#), [Women Working in Games](#), [MMO](#), [Sony](#), [PC](#)
[Comments \(6\)](#) [Email](#) [Share This](#)

[Women Working In Games — The Multiplayer Wrap-Up](#)

[1 Comment](#) | Posted by [Stephen Totilo](#) on 12/26/07 at 9:58 am.



We're on vacation this week but trying to keep you informed and entertained with a round-up of our favorite Multiplayer content.

MTV Multiplayer blogger **Tracey John** had been wanting to interview women in the gaming industry for quite some time.



June 01, 2009 02:29pm AEST

Google unveils Sydney HQ

Andrew Colley | June 01, 2009

AUSTRALIA'S Governor-General Quentin Bryce opened Google's new Sydney headquarters today saying she thought Google employees were 'cool'.

The new office, situated opposite Star City Casino in Pyrmont is the new base for Google employees which have grown from one in 2002 to 350 current full-time staff.

Ms Bryce was called on to sign a portrait of the Google brand hovering above the Sydney Harbour Bridge before Google Australia chief Karim Temsamani gave her an extensive tour of the new facility.

"I knew it'd be like this - it'd be gorgeous to walk in here and it'd all be exciting and exhilarating and that you'd all be cool," Ms Bryce said.

Mr Temsamani announced that the company had entered a deal with Fairfax Media to digitise historical micro-fish archives of its Melbourne and Sydney mastheads, The Age and the Sydney Morning Herald, online.

Google also announced that it would pipe information from Sydney's monorail and light rail, and Canberra's bus network ACTION into its mapping service later this month.

Copyright 2009 News Limited. All times AEST (GMT +10).